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THE TREND OF ECONOMICS

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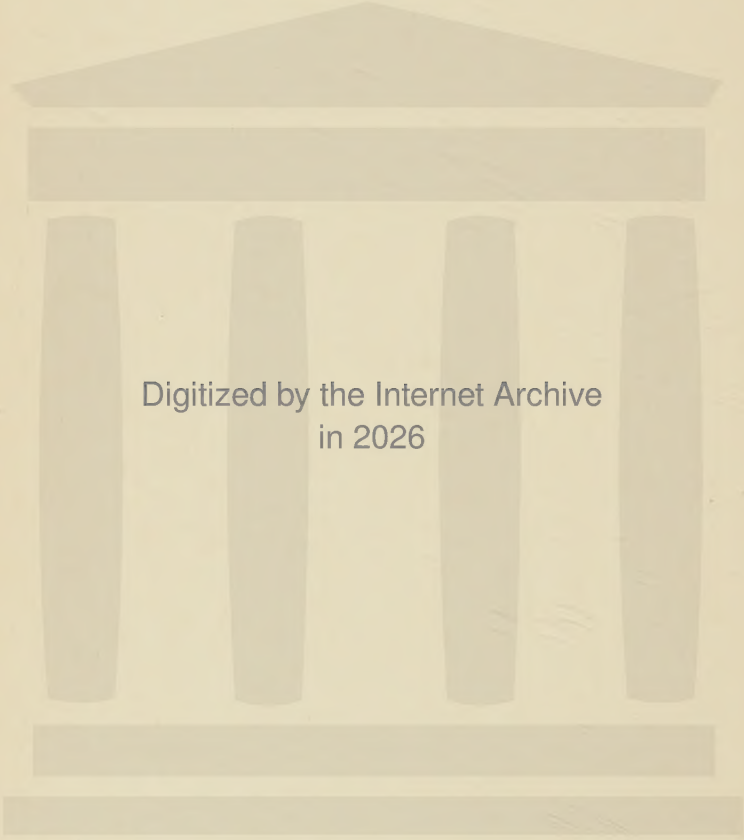
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THE TREND OF ECONOMICS

THE TREND OF ECONOMICS

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INTRODUCTION

The first suggestion for this book had its origin in my own feeling that coöperation in economic theory could and ought to be made more genuine; and that a first step in this direction could best be made by each of us whose chief efforts lie in this field setting himself the task of saying quite definitely what seemed to him to be the main lines of development and expressing his opinion as to their fruitfulness. Then, at least, if we could not coöperate, we should know quite clearly why. The response to this suggestion, first made to the contributors here who happened to be present at the meeting of the American Economic Association in Chicago in December of 1922, was so considerable that it soon grew into a definite project of formulation and publication, the final form of which is presented here.

We have desired to make a book which should be useful especially to students of economics; but also, in lesser measure, to all persons who have an interest in the development of economic society. Students of economics who feel it important for their purposes to know the attitudes of any of the contributors toward the problems of economics and the methods of economic research ought not to have to look further. What each of us thinks is formulated here. But also there has been another purpose than that of setting down our personal attitudes. Each contributor has dedicated his career to economic study; and as a consequence of this, or perhaps as a precondition of such a dedication, he is one who has close to his heart the good of industrialism and the good of industrial theory. And this has seemed preëminently the place to plead for the truth he has come by, concerning (1) what the trend of economic science is, (2) what it seems to him that it ought to be, and (3) what contribution his own theory makes.

This explains somewhat the character of the book and, I hope, forestalls certain criticisms that may be made concerning repetitiousness. For it seemed much more important to get honest, and, indeed, passionate opinion, than to get a great covering of territory. If each of us found that certain problems could be said to be of supreme importance, and if, in some measure, many of us agreed upon which they were, that ought to be a valuable discovery in the sense that it must certainly lead to a greater concentration of effort upon their

solutions. If we further agreed upon the method of attack, that would be a still greater gain. And if, even beyond that, we succeeded in defining certain common goals, that might be the greatest benefit of all. It has been a great joy to me to see, in the finished manuscripts, how these hopes of my own have been measurably fulfilled, and where they have not, how clearly attitudes which run counter to main trends have been expressed.

Each contributor was asked plainly and briefly to write out what he had upon his mind concerning economics. And that was about all there was to it, except that it was made clear that this book was to present an opportunity to deal not only with the problem of best method but also with the larger problems of the whole direction of our industrial system and its control, and of the place in all this of economic theory. Some seized the opportunity to discuss these larger problems. Some preferred to develop the importance of their own corners of theory; some discussed methodology exclusively. Matters of methodology generally have been subordinated, however, as it turned out, to the larger issues of general trends and their significance. But not altogether. That would have been undesirable.

There were no limits of subject matter. No one was asked to write about any particular subject. Rather, he was asked to write about the subject that seemed to him of supreme importance. If it happened that two or more contributors wrote about the same topic this was not considered undesirable, but rather as useful in helping us to come to common ground and to understand each other. And this has happened. Many of us have found our thoughts turning to the puzzling complexity of industrial life as a major modern problem, understandable and resolvable only through the use of measuring tools. Many have been impelled to express opinions on the mutual reactions of human nature and economic institutions, this leading finally into discussions of ethics. Most of us have considered the chance that economics may become more or less "scientific." Many have expressed opinions about the contemporary method of teaching economics, in what, I am afraid, are no uncertain terms. Since the chief occupation of all of us, with a single exception, is teaching, this was likely to happen, just as it was likely that we should have more definite opinions about the major fields of our teaching than any other. We did not agree about any of these matters unanimously; but in most of them the reader will discern a heavy weight of opinion on one or the other side; and he can come to his own conclusion from the arguments that defend them.

This suggests the only principle of selection that was used. Obviously so small a group cannot represent current economic opinion in all its phases. But many phases are represented. Men have been drawn in who were interested mainly in the theory of prices, or the history of theory, or in quantitative measurement, or in regional comparison, or in the labor movement, or in legal economics or in proposals for economic reorganization. And naturally they have looked at economic development from their own angles of effort; and have said what really was obvious in their choice of a field, that the problems in it seem to them to be of perhaps greater importance than those in any other. It will be evident, however, that there has been an exceptionally good temper and a willingness to grant, if not first, then an immediate second place to other kinds of effort. No one of us believes, I think, that his own program is a panacea. Far from it, indeed. Every back seems turned, these days, upon Utopia; and ours, it seems, among the rest.

It will be said, I suppose, that this book is a sort of a manifesto of the younger generation; and in a sense it is that, though none of us, I think, has meant to put first in his writing the critical attitude. We were bound, as a part of a tradition, from which we could not separate ourselves if we wished, to consider the work of our predecessors and to appraise its worth to us now. There has been no hesitation about this, as there should not have been. But in all of us there is a deep sense of the debt we owe to the generation that was our training school, though we may feel, more or less, that their contributions to theory and their attitudes toward industrial life, were of doubtful value in many cases. There would always be some who would feel this more than others; and this difference is reflected here. Contrasts of Professor Bye's and Professor Knight's work with that of Professor Clark or Professor Wolfe, bring the difference out quite clearly.

One sense in which it can be said that the contributors here are of the younger generation is that none of us has published a book of the traditional sort called *The Principles of Economics* (though several of the group have such books under way) and so cannot be said to have given definite theoretical hostages. Another sense in which it could be said is that most of us are really younger in age; also that we have been trained largely in American Universities whereas our teachers were trained in Germany, and are therefore face to face with the conditions of a different and more complex life than they faced at our age. Some others, however, such as Professor

Mitchell and Professor Wolfe, not being so young as most of the rest of us, have, however, evidently thought that the matter of years was not so important as the matter of mental flexibility; and we, thinking of them as belonging to us, rather than to the really old generation, and wanting them to coöperate with us, have been content not to raise the question. We have thought that it might be valuable for a new group, mostly specialists rather than general theorists, to define our positions in the general field. And this is that definition.

Personally I have a considerable regret that a larger number of the younger economists could not have been included. I do not think that most people realize the gathering force of the renaissance of economic thought we are having in this country; nor how long a list could be made of younger men who are doing work of the utmost importance for our industrial civilization. However I hope that those who have not written for this book will find in it somewhere a representation of their thought. It has certainly been drawn from a number of different schools. Both deductivists and inductivists are here. So are the neo-classicists and the institutionalists. So are the marginalist logicians and the experimentalists. So are the behaviorists and the functionalists. But above all, I hope that they will see that when one comes to really stating his theoretical position and to justifying it, he finds himself in many essentials at one with others who may at first have thought of themselves as having an entirely different orientation. For modern economic thought is merging, as it was bound to do, with all our many modern forums devoted to the exchange of opinion—the journals, the association meetings, the publication of books—in a common stream flowing toward a common sea. That has never seemed so clear to me as it does now after working upon the manuscripts of this book; and I think it will appear just as clearly to any careful reader of these papers. Out of this gathering and merging in a coöperative intellectual enterprise of younger economists will come results that cannot at all be forecast from where we stand at present because there never has been anything comparable to it in the whole history of past thought. But it stirs the imagination profoundly; in it, and in the like coöperations of the other sciences, together with the possibility of their successful interchange of thought, there lies the possibility of a remade world—no less.

For the convenience of the reader who may wish to know something more about any individual writer here than appears from reading his contribution, a sort of "who's who" is appended which gives a résumé of the intellectual history of each author. Included in it is

a complete bibliography of the published writings of each of us.

Also, so that what is significant in recent economic development may be made more completely available to anyone who cares to read further, and especially, of course, for the use of students of economics, a bibliography is appended. It is what might be called a "synthetic" bibliography. Professor Wolfe submitted the first list and it was sent, then, for additions, to as many of the contributors as could be reached. It, therefore, does not represent the opinion of any one of us concerning what is important in recent economic literature, but, rather, includes what each of us thought to be the most significant contributions he knew of. This will help to repair the omission of so many important thinkers from the list of the contributors here.

As editor, I have certain acknowledgments to make. Mr. E. J. Allen labored beyond all reason to make a useful index; Mr. E. E. Neff worked over the manuscripts and proofs in such fashion as to enlarge a debt to him that was already unconscionably large; all the contributors exhibited such forbearance and such a compromising disposition as, if the whole of the matter could ever be known, would appear most truly remarkable. And they were not only patient: they were interested and helpful beyond my deserts, who proved to be a most importunate editor. I can only acknowledge these debts; there is no way of paying them.

REXFORD GUY TUGWELL

Columbia University
January, 1924.

THE PROSPECTS OF ECONOMICS

by

WESLEY CLAIR MITCHELL

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THE PROSPECTS OF ECONOMICS

I

FOREWORD

Whether economics is to us a subject of thrilling interests or a dismal pseudo-science depends upon ourselves. If we come to it with literal minds, seeing only what has been definitely accomplished, we find the discussions dull and the conclusions dubious. But if we come thinking of man's long struggle to master his own fate, then the effort to solve economic problems seems a vital episode in human history, a hopeful portent for the future. Seen in this perspective, economic speculation represents a stage in the growth of mind at which man's effort to understand and control nature becomes an effort to understand and control himself and his society. The beginnings of that effort may be crude, yet they stand for a high endeavor. And the future of economics, the question whether men will ever succeed in establishing a serviceable science of economic behavior, becomes one of the crucial issues on which hangs the doubtful fate of human kind.

At present the prospect of making progress in economics is bright. We seem to be entering upon a period of rapid theoretical development and of constructive application. To justify this faith is my chief task in the following pages. But to do so I must sketch the various types of theory developed since the Napoleonic Wars impoverished Europe, showing what manner of thing economics has meant to successive generations, what varying outlooks it has opened before them, what hopes they have cherished for its future development, and how they have striven to apply its teachings. Against this background I can make clear where economics stands today, what it promises to become, and what uses it may serve in the years before us.

II

THE PAST

1. RECONSTRUCTION AFTER THE NAPOLEONIC WARS AND THE RISE OF CLASSICAL POLITICAL ECONOMY

Orthodox economic theory as we have it today inherits its problems and its methods from classical political economy. Classical political economy in turn got its problems from English politics in the period of reconstruction that followed Waterloo, and its methods from the conception of human nature then current among philosophers and men on the street.

The Napoleonic Wars had forced England to suspend specie payments and brought on an extraordinary rise of prices. They had imposed upon the nation heavy taxes and added four billion dollars to the domestic debt. But during the long struggle England had been sustained by the rapid development of her manufactures. The Industrial Revolution which had begun in the eighteenth century was accelerated during the wars, and the high profits of manufacturers and merchants bore the brunt of war loans and taxes. At the same time these newly rich manufacturers and merchants gained in political cohesion and power much as the English Labor Party gained in the war against Germany. But the growth of manufactures brought with it a new difficulty. The diversion of labor from fields to factories together with the rapid increase of population made England dependent upon foreign countries for a part of her food supply, despite an extension of cultivation and a marked improvement in agricultural methods. Finally fear that the revolutionary spirit in France might spread had produced a violent reaction in English politics, not unlike the reaction which fear of the Russian revolutionary spirit produced in 1918. The Tories remained in power during the wars and for fifteen years longer; they stubbornly resisted reform and thereby stimulated the very agitation they dreaded.

On the return of peace in 1815, England faced a series of problems much like the problems she faces today. What should she do about the depreciated currency and the high cost of living, about the heavy taxes and the war debt? How could she obtain cheap foreign grain without injuring her farmers and landlords? How should she meet the demands of the new manufacturing towns for political representation and allay the unrest among the laboring classes? It was

with these problems of reconstruction that Ricardo, the chief architect of classical political economy, was concerned as an economist and a member of Parliament.

Nowadays the newspapers would call Ricardo "a millionaire radical." He was a staunch champion of free speech in days when free speech was even more unpopular than it has been among us of late. He advocated the resumption of specie payments, the reorganization of the banking system, and the systematization of the taxes. Though very rich, he demanded a levy on capital to pay the war debt. Though he had entered Parliament "through his breeches pocket," he advocated Parliamentary reform. Though a great landlord, he labored for the repeal of the import duties on grain. It was out of his analysis of this last problem that he developed the main lines of his economic theory.

When Napoleon was sent to Elba and trade was reopened across the Channel the English landed interest feared they would be ruined by a flood of cheap continental wheat. As a safeguard they proposed to raise the import duties on grain. This project roused a storm of opposition. Parliament was besieged with anti-corn-law petitions from the towns and industrial districts, "the greatest number of petitions that has ever perhaps been known" said Lord Grey. Sir Robert Peel warned the Commons that "if the measure passed the manufactures of the towns would be destroyed." For it was believed that dear grain meant high wages, and that high wages meant ruinously low profits. The debate in Parliament grew into a self-conscious class struggle between the landlords and the capitalist employers. The working classes, and this touch is especially characteristic of the times, were not a party to this struggle; they had no spokesmen of their own in Parliament, they were not even supposed to have anything at stake. To talk of the laborer being interested in the bill, said Alexander Baring, was "altogether ridiculous; whether wheat was 120*s.* or 80*s.*, the labourer could only expect dry bread in the one case and dry bread in the other."[1]

This struggle over the corn laws made the distribution of income the chief issue in English economic policy. Ricardo, as a man of his day, made distribution the chief problem in economic theory. The practical problem was whether the power of the state should be used to maintain the high incomes of the farmers and landlords, or whether the import duties should be reduced to safeguard the in-

[1] See the account of the corn-law debates in William Smart, *Economic Annals of the Nineteenth Century, I,* 450–457.

comes of manufacturers and merchants. The theoretical problem was: what determines the proportions in which the national dividend is shared between landlords, capitalists, and laborers?

Ricardo solved this problem by propounding three separate laws of rent, profits and wages. The poorest land in cultivation, he held, yields crops sufficient merely to pay the ordinary rate of profit to the farmer who works it and ordinary wages to the laborers he employs. "The natural price of labour," Ricardo goes on, "is that price which is necessary to enable the labourers, one with another, to subsist and to perpetuate their race, without either increase or dimunition." Of course the market price of labor, "the price which is really paid, . . . may, in an improving society, for an indefinite period, be constantly above" the natural rate. Further the natural price itself is not "absolutely fixed and constant," for it "essentially depends on the habits and customs of the people." A rise in this standard of living is much to be desired, but not to be counted on. For Ricardo was a firm believer in the theory of population propounded by his friend Malthus. Practically, he held, we must face the hard fact that if wages rise perceptibly above the established standard of living, the numbers of working people will soon increase and the larger supply of laborers will again reduce wages to the old level. So in economic theorizing we may, indeed we must, take wages as a constant, fixed by the standard of living. Such is Ricardo's version of Alexander Baring's remark that the laborer had no interest in the corn-law bill, "whether wheat was 120*s.* or 80*s.*, the labourer could only expect dry bread in the one case and dry bread in the other."

With wages a fixed quantity, the law of profits presented no difficulty. The farmer cultivating no-rent land pays his workmen what is needed to enable them to maintain the established standard of living. For himself he has whatever is left after meeting his payroll. Hence, the share of the produce that goes to profits varies inversely as the share that goes to wages. In Ricardo's language "profits depend on high or low wages, wages on the price of necessaries, and the price of necessaries chiefly on the price of food." The poorer the land cultivated, the less will the agricultural laborer produce over and above what is required by his fixed standard of living, and the less produce will be left to his employer for profit.

Now this sharing of the produce on the poorest land in cultivation "regulates" the sharing between laborers and capitalists in all other enterprises thruout the country. For under a régime of free competition farmers of one class of lands cannot long make profits either

greater or less than farmers of other classes of lands. Nor can men who embark their capital in manufactures or trade expect profits greater or less than the profits of farmers of no-rent lands. For if they made higher profits, the no-rent farmers would go into manufactures or trade, and, if they made lower profits, the manufacturers and merchants would turn to farming. All over the country there is substantially one basic rate of wages and one basic rate of profits, with certain permanent differentials to compensate for the exceptional risk, difficulty, or disfavor attaching to particular occupations.

This conception of a basic rate of profits and wages in all occupations makes it possible for Ricardo to complete his theory of distribution by laying down the law of rent. Competition among farmers bidding for leases will force them to offer for every farm that is to let a rent per acre just equal to the value of the produce it yields over and above what an acre of the poorest land in cultivation would yield to a like outlay of capital and labor. For if a given farm were leased at a lower rent than this differential, the lucky tenant would receive more than the going rate of profits. Of course competitors would not let any farmer get so good a bargain. On the other hand, no farmer would knowingly pay a rent so high that he would have left for himself less profit than he could make on no-rent land.

These three laws of wages, profits, and rents in the present, Ricardo supplements by three other laws concerning the tendencies of wages, profits and rents to change in the future. The fundamental factors in future developments are the likelihood that population will increase and that methods of production will improve. The increase of population will require larger food supplies and force men to resort to successively poorer grades of land and more intense cultivation. We cannot expect that improvements in agricultural methods will do more than partially offset this force that is constantly making it harder to wring a living for the population from the soil. In manufactures, on the contrary, the prospect is that improved technique will more than compensate the increasing cost of raw materials. Therefore "The natural price of all commodities, excepting raw produce and labour, has a tendency to fall."

"The natural tendency of profits" is to fall; for in the last analysis profits vary inversely as "the quantity of labour requisite to provide necessaries for the labourers, on that land or with that capital which yields no rent," and this quantity increases as the decline in the original powers of the soil to which resort must be had outruns the effects of improvements in methods of agriculture.

"In the natural advance of society, the [real] wages of labour [also] have a tendency to fall, so far as they are regulated by supply and demand; for the supply of labourers will continue to increase at the same rate, whilst the demand for them will increase at a slower rate," since the decline of profits checks the accumulation of capital.

Rent on the contrary tends to rise. Indeed the landlord scores a double gain; the declining margin of cultivation means larger rents in produce, and each unit of produce means larger purchasing power over manufactured goods.

Hence, despite the checks interposed repeatedly by improvements in methods of production, the time seems coming when "the very low rate of profits will have arrested all accumulation, and almost the whole produce of the country, after paying the labourers, will be the property of the owners of land and the receivers of tithes and taxes."

Such are the chief conclusions of Ricardo's *Political Economy*. They are simple yet drastic. Wages are fixed by the standard of living and the pressure exerted by the growth of population makes it difficult to prevent that standard from sinking slowly. Profits also will shrink as more and more labor is required to provide necessaries for the mass of the working population. The future belongs to the landlords, who will grow richer while the laborers and capitalists grow poorer. "It follows," says Ricardo, "that the interest of the landlord is aways opposed to the interest of every other class in the community."

2. RICARDO'S CONCEPTION OF HUMAN NATURE AND OF SOCIAL ORGANIZATION

How did Ricardo reach these sweeping conclusions? How did he defend them against critics? His way of working is important for us because it exercised even more influence than the conclusions to which it led.

Ricardo had been an eminently successful financier for years before he became an economic theorist. He had lived on the apex of the business pyramid, and from that lofty perch he had surveyed the surrounding realms of merchandizing, manufactures, and agriculture. Concerning the details of making and selling actual commodities he had little practical knowledge, or he could never have said that "in the production of manufactured commodities every portion of capital is employed with the same results and no portion pays a rent." But he felt that he had the essential facts in hand. When he came to write his book, he re-read Adam Smith, Say and Malthus; but he did not seek to collect new data concerning wages,

profits, or rents, or question in any way the oversimplified analysis of human nature which he found in those writers. His conclusions rest on the broad assumptions concerning economic behavior which a thoughtful financier had found dependable, and which he saw no occasion to test critically.

For his purposes capitalists are animated by a "restless desire" to find the most profitable investments, modified by a conventional eye for the non-pecuniary disadvantages of certain trades, and a not-insuperable preference for home over foreign investments. His laborers are creatures ruled by habit and a tropismatic longing to marry. His landlords are Olympians raised above economic strife, reaping their double gains in idleness and honor. "Their rent is the effect of circumstances over which they have no control, excepting indeed as they are the law makers, and lay restrictions on the importations of corn."

Similarly, the social organization under which these three classes live is simple and enduring to Ricardo. Social organization had changed in the past, for Ricardo could look back to "that early and rude state of society which precedes both the accumulation of stock and the appropriation of land." But social organization had reached maturity and would not change materially in the future. He did indeed expect that "the progressive state" in which he lived would run down like a clock into "the stationary state," that is the state in which population stops growing and capital stops accumulating. But this change implies no serious shift in social organization. In the stationary state there will be the same three classes of men dividing the fruits of industry; the same system of private property, investment for profit, and production for the market, the same dependence of the mass of mankind upon wage-labor, and the same government maintaining "security." Various minor reforms are feasible, but the institutional framework of society will remain what it is. Men like Robert Owen who cherished hopes of an economic revolution were "visionaries."

Not that Ricardo had a high opinion of the existing social order—far from it. Besides the minor faults he strove manfully to mend, he saw fundamental faults that would abide. On his showing the existing order presents an irreconcilable conflict of interests. It is true not only that "the interest of the landlord is always opposed to that of the consumer and manufacturer," but also that "There is no way of keeping profits up but by keeping wages down." And there is nothing to be done about these class conflicts; they are as much a part of the natural order as the scarcity of fertile lands.

Furthermore: "Nothing contributes so much to the prosperity and happiness of a country as high profits"; yet the inevitable drift of prosperity is to stimulate the accumulation of capital, to reduce profits, and thus to destroy itself.

The reason why we must acquiesce in the present order despite its fundamental defects is found in "that principle which should ever be held sacred, the security of property." This principle is sacred for no mysterious reason: it has its ground in ordinary human nature. Even the laborers whose prospects are so drab would find any disturbance of the present order a catastrophe:

> . . . . for the quantity of employment in the country must depend, not only on the quantity of capital, but upon its advantageous distribution, and, above all, on the conviction of each capitalist that he will be allowed to enjoy unmolested the fruits of his capital, his skill, and his enterprise. To take from him this conviction is at once to annihilate half the productive industry of the country, and would be more fatal to the poor laborer than to the rich capitalist himself. This is so self-evident that men very little advanced beyond the very lowest stations in the country cannot be ignorant of it.

Ricardo's type of economics, then, consisted of conclusions reached by reasoning from a few broad assumptions that over-simplified the facts. Human nature is far less simple and social organization is far less stable than he assumed. Improvements in production have been more sweeping, the rise in the standard of living has been more rapid than he expected, and the birth rate has declined. Consequently most of the conclusions which Ricardo drew about the future have proved to be mistaken. The landed proprietors of England have not gained in wealth faster than the capitalist classes; profits probably have not declined, real wages have not been stable, it has not become harder to wring a living from the soil, England has not approached the "stationary state," but seems to be swirling in a current of change today quite as truly as when Ricardo wrote.

Yet Ricardian economics is not to be dismissed lightly as a tissue of false conclusions spun from mistaken assumptions. It may be that in good part; but it is also the first vigorous attempt to think through the tangled problems of distribution on the basis of such knowledge of human nature and social organization, and with such analytic technique as was available when practical politics brought the capitalist class into sharp conflict with the landed interest. We learn something by dwelling on Ricardo's errors; but we can learn more by considering what use successive generations have made of his work, and how they have improved upon it.

3. WHY RICARDO'S TYPE OF ECONOMIC THEORY REMAINED DOMINANT SO LONG

The class which was rising to power in the two generations following Ricardo's death accepted his political economy as established truth, a safe guide to public policy.

Ricardo's arguments reinforced Adam Smith's case for free-trade and Malthus' case for checking the increase of population. The new poor law was enacted in 1834 and England completed the gradual abolition of her protective duties by repealing the corn laws in 1846. Sir Robert Peel followed Ricardo's specifications when he reorganized the Bank of England in 1844. Economists were seated in Royal Commissions and employed in the Civil Service. Chairs of political economy were founded in Oxford and Cambridge, and elementary text books were prepared for the use of school teachers and governesses. By popular lectures before Mechanics Institutes, newspaper articles and propagandist pamphlets an attempt was made to spread the truths of political economy broadcast among the working classes. Miss Martineau's tales illustrating the economic verities sold by the ten thousand. Clever writers applied economic theories to questions of the day in the quarterly reviews, and liberal parsons like Sydney Smith represented economics in the church. The English classics were promptly republished in the United States, and translated into foreign tongues for the benefit of the Continent. Nor did political economy suffer from intellectual isolation. It was part of the wider growth of Philosophic Radicalism and so had stimulating contacts with other social disciplines. Historians like Grote, Buckle, and Thorold Rogers were among its votaries; anthropologists like Hearne wrote economic treatises, psychologists from James Mill to Alexander Bain expounded the conception of human nature which the economists took for granted, John Stuart Mill and Walter Bagehot elaborated and defended the logic implicit in Ricardo, John Austin systematized jurisprudence on lines that harmonized with economics, the revolution in biology was started by Darwin's reflections upon an economic doctrine, and Herbert Spencer began his career with a book which set forth the political theory of the economists in uncompromising form. Never in fact has political economy enjoyed such popular favor and intellectual prestige, never has it exercised such practical authority as in the two generations that followed Ricardo.

One might well expect that all this popular and scientific interest, all these practical applications would cause a rapid development

of economic science. Ricardo had made a hasty survey, he had propounded sweeping conclusions; these conclusions bore directly upon current politics, they aroused keen controversies. Yet in 1848 orthodox political economy remained substantially what Ricardo had made it in 1817. What explains the scientific sterility of these thirty-one years of writing, teaching, and debating?

It is good for a social theory to be applied in practice, for the exacting test of application reveals imperfections and suggests new developments. But it is bad for a social theory to get into politics. Ricardo's conclusions had the misfortune to become a party platform. Just because his economic laws had been made to solve the political problems of his own day, they could be warped to political uses so long as the problems from which they grew held the political stage. Of course a theory that gets into politics hardens into a dogma. It becomes a target of partisan attack and an article of partisan faith. It ceases to be a working hypothesis tentatively accepted as a guide to further investigations. Men exercise their wits as debaters in making out a case for or against it, not in critical efforts to amend or extend it.

But all this popular use and abuse of classical political economy could not have kept it from growing if its best exponents had not worked out a deadening line of defense. They pointed out that Ricardo's conclusions rested on certain postulates, that the science was hypothetical, that it was a doctrine of "tendencies." To demonstrate that the conclusions of political economy were at variance with notorious facts, therefore did not discredit the conclusions. The tendencies it dealt with really existed though they might not be obvious; these tendencies would stand out clearly if real life answered to the economists' hypothesis; the conclusions were consistent with the postulates however the facts might stand.

Now this line of defense was logically valid, and the men who developed it clarified the situation. But having attained clarity regarding the logical position of their science, they stopped. They were content with a type of economics which dealt with tendencies, which argued from unreal hypotheses, which rested on postulates contrary to fact. The birth rate might fall while the standard of living rose; but Malthus was none the less right. Instead of bringing poorer lands into cultivation English farmers might restrict the cultivated area, but that did not refute Ricardo. Statistics might reveal the greatest diversity of profits, but still profits "really tended to a minimum."

Economists who took this line might be technically right in every

one of their contentions; it matters little whether they were right or wrong. What does matter is that by taking this line they lost the most powerful incentive to further achievement. If economics does not attempt to explain the concrete facts of economic life, then all that Ricardian economics needed was skillful exposition, the correction of minor lapses, and certain extensions along the original lines. Economic truth had been found and would abide so long as logic lasted, no matter what paradoxical developments appeared in the world of railways, centralized banking, trusts and trade unions; no matter what facts the statisticians pressed, no matter what the anthropologists learned or how the psychologists shifted their ground.

Probably the economists would not have remained long in this stationary state if they had seen how to progress by any other method than Ricardo's. But they did not have the historical knowledge, the statistical data, the psychological insight or the technical methods of analysis which were required to work effectively in a more realistic fashion. It was indeed possible to make a beginning in this direction, and some among Ricardo's contemporaries and successors did so. But their example was not encouraging. What results they reached seemed meager, negative and uncertain in comparison with the large, positive and logically-proved conclusions which Ricardo had excogitated so rapidly. The orthodox economists might feel ill at ease when forced to face some awkward facts, but their self-esteem returned when they dipped into the books of their unorthodox brethren. And in 1848 came John Stuart Mill's great treatise to confirm their faith in the Ricardian tradition.

The foremost logician of his day, the moral leader to whom young liberals like James Bryce and John Morley looked for inspiration, the sympathetic yet constructively critical friend of social reform, the admirable stylist—Mill had an intellectual prestige among contemporaries such as no other economist has ever approached. His *Principles of Political Economy* had a flavor very different from Ricardo's book. It glowed with a temperate optimism concerning the future, because Mill saw that economic institutions are malleable. He believed that a coöperative management of industry would prove efficient, that capitalists might find it advantageous to lend their funds to coöperative associations for terminable annuities, and that in "some such mode, the existing accumulations of capital might honestly, and by a kind of spontaneous process, become in the end the joint property of all who participate in their productive employment: a transformation which, thus effected, . . . would be the nearest approach to social justice, and the most beneficial ordering of social af-

fairs for the universal good, which it is possible at present to foresee." Further he thought that human instincts, particularly the instinct of sex, would be brought under control by education. Thus he escaped from the bugbear of Malthus. But with all his hopefulness and with all his social sympathy Mill yet built his political economy on the Ricardian foundation by the Ricardian methods. And the very merits of his version served to prolong the sway which the classical type of economic theory held over the minds of men.

4. THE MECHANICS OF UTILITY

A new type of economic theory, so its author believed, was announced to the world by Stanley Jevons in 1871. He called it "the mechanics of utility." Unlike Ricardian economics, this new type was based explicitly upon psychology. For his psychology Jevons went back to *The Principles of Morals and Legislation* printed in 1780 by one of Ricardo's elder friends, Jeremy Bentham. Thus the new economics started with a psychological system which was already ninety years old, or even more antique if we trace it back of Bentham.

Bentham represented men as dominated by two masters, pain and pleasure. Therefore, said Jevons, pleasures and pains are the ultimate quantities in economics. We value goods because of the pleasures they give us in consumption; we dislike to labor and to wait in producing more goods because these efforts are painful. A science can be erected on this basis, since pleasure and pain are measurable quantities which vary continuously in magnitude according to the amount of goods we possess or of the effort we make. The last hour of the day's work is more painful than the first hour; the goods produced in the last hour give us less pleasure than the goods produced in the first hour. When we come to the moment where the pleasure to be had from further products ceases to exceed the pain of further labor we stop work. Similarly, in exchanging goods, we carry on trading up to the margin where another increment of what we obtain would give us no more pleasure than we should lose by parting with its price. Thus economic life is really systematized by calculations of utility and disutility. By following this clue the economic theorist can explain the phenomena of production, exchange, distribution, and consumption. That is the central idea which Jevons suggested and which others worked out in detail.

About the same time that Jevons brought out his *Theory of Political Economy* in England, Carl Menger expounded substantially the same ideas in Austria, and Leon Walras in France. A little

later John Bates Clark followed suit in the United States. Utility analysis from these four sources impressed most economists as radically different from Ricardo's type of theory because Ricardo had explained value mainly by cost of production, taking utility for granted. After due deliberation, lasting some twenty years, the economists became excited and began a lively controversy on the relative merits of cost analysis and utility analysis. Zealous spirits took sides, as if the issue were of the either-or variety. But more cautious men like Alfred Marshall, the most conspicuous of later English theorists, refused to subsume cost under utility or utility under cost, and held that both factors in conjunction determine values. Such men were dubbed eclectics for their caution.

I pass lightly over the controversy because it appears in retrospect to concern a minor issue. Jevons, Menger, Walras, Clark and their disciples did not really produce a new species of economic theory; what they had found turned out to be merely a new variety of the Ricardian species. The utility theorists and the cost theorists held the same conception of human behavior, they worked at the same problems, and employed the same methods. Under these circumstances their differences were bound to be superficial. Indeed the two lines of analysis were so much alike that they harmonized admirably when Marshall incorporated both into a single framework.

5. THE "PSYCHOLOGICAL SCHOOL" AND ITS TROUBLES

Less noticed but more important in the long run was the issue Jevons raised by making his doctrine of utility rest explicitly upon Bentham's psychology of pleasure and pain. This foundation began to create uneasiness about the time utility theory came into favor among economists. For certain writers cultivating the borderland between economics and philosophy warned economists that the psychologists were questioning hedonism. Even Henry Sidgwick, who succeeded John Stuart Mill as leader of the English utilitarians, averred that he ate his dinner because he was hungry, not because he anticipated pleasure. The economists were perplexed. They knew no psychology and had not realized that they were implicit hedonists. Yet they did not know how to controvert the statement, and they had to believe that hedonism must be faulty if psychologists said so. What should they do? Could they find a sounder psychological basis for economics than hedonism? Could they prove that their theories remained valid though the alleged psychological foundation crumbled? Could they perhaps dispense with a psychological foundation altogether?

Of course the easiest thing to do was to do nothing;—that is, to continue expounding economic theory in the traditional fashion without raising the psychological issue. Menger, Walras, and Clark, in developing utility analysis, had said nothing about hedonism; why not follow their example instead of the example set by Jevons? So Alfred Marshall in the later editions of his *Principles* contented himself with substituting the word "satisfaction" for the word "pleasure," as if such verbal changes cleaned his skirts of hedonism. Others like Irving Fisher and Herbert J. Davenport expressly repudiated hedonism and professed to dispense with psychology altogether by making economics "the science that treats phenomena from the standpoint of price." They took each individual's scale of price offers ready-made by whatever process the psychologists fancy as the starting point—a starting point which it was their business to use in explaining prices, but which it was not their business to inquire into. Professor F. A. Fetter pursued a third course. In his *Economic Principles*, 1915, he undertook to present "a quite new statement of the theory of value, one in accord with the modern volitional psychology, thus eliminating entirely the old utilitarianism and hedonism which have tainted the terms and conceptions of value ever since the days of Bentham. The basis of value is conceived to be the simple act of choice, and not a calculation of utility. Even the phrase 'marginal utility' is definitely abandoned." But one finds as he reads Professor Fetter's book that the quite new theory of value is followed by the familiar doctrines of prices, rent, wages, interest, and profits. What an economic treatise says about the psychology of value seems to make no difference in its economic theory.

All this means of course that our orthodox economists have a most inadequate conception of psychology—and economics also for that matter. They write as if the economist's only concern with psychology lies in the problem of motive. If pleasure and pain are not the motives of valuation, then what are the real motives, if any? That is the sole psychological issue they have grasped. When they pass on from the value problem they think themselves out of the quagmire of psychology on firm economic ground. Obviously this is a grand error. Economics is necessarily one of the sciences of human behavior. Whether its votaries recognize the fact or not, it endeavors to show how men deal with each other in getting their livings. Now no man can possibly give an account of economic behavior without having some working notions of human nature in the back of his head if not on his tongue. No one can lay down any proposition

about business transactions without implying that men have certain standard ways of feeling, thinking, and acting in their market dealings with each other. It is therefore naïve to talk of divorcing psychology from economics. If Davenport's "science that treats phenomena from the standpoint of price" helps to explain the behavior of men, that theory is itself a piece of psychologizing, good or bad. It is equally naïve to talk as if the economist borrowed or could borrow all his psychological notions from the psychologists. For if economics deals with economic behavior, then it must go beyond the contributions which the professed psychologists make to the general science of behavior. The economist will learn more in his own field of course if he begins tilling it with sound psychological conceptions to help him; but the soundest general conceptions of "the original nature of man" and its modifications in the course of experience will be merely a starting point for his own researches into human behavior.

If ideas of this sort are beginning to dawn upon economists, it is partly because the younger men are reading psychological literature, but mainly because certain among the older men have been cultivating an unorthodox type of economic theory—a type of theory that deals with a range of problems undreamt of in the philosophy of value and distribution. This type is perhaps best called institutional economics.

6. INSTITUTIONAL ECONOMICS

Among Ricardo's contemporaries was Richard Jones, a clergyman of the Church of England, who knew enough of economic history and of contemporary conditions outside of England to appreciate that Ricardo's whole system applied to an institutional situation recent in its development and limited in its scope. Accordingly Jones set himself to broaden the basis of economic theory by studying the distribution of wealth in other times and other lands. The result was a book which dealt with rents under the feudal system, with metayer rents in antiquity and in modern Italy and France, with ryot rents in India, cottier rents, and finally with contract rents such as Ricardo had discussed.[1]

Jones was by no means the sole worker who studied economic institutions. For example, Sismondi, the historian of medieval Italy, investigated the development and cultural consequences of the industrial revolution in England; John Rae, who lived long in Canada

[1] *An Essay on the Distribution of Wealth*, 1831.

and saw something of economic life among the Indians, showed how different institutions affect invention and the accumulation of capital; Robert Owen and William Thompson, Saint Simon and Fourier, sought to devise a new set of institutions which would insure a juster distribution of labor and income. Nor were the orthodox economists wholly hostile to this kind of work; for we have seen that John Stuart Mill emphasized the influence of institutions upon distribution, and placed his hopes for the future upon institutional changes. But such excursions into institutional economics were not considered to be really a part of economic theory—they were "applications of social philosophy" in the language of Mill's sub-title.

This mistake of differentiating economic theory from the study of economic institutions was confirmed by the rise of the German historical school in the eighteen forties. For the German critics of English political economy gradually worked themselves up to the point where they felt it necessary to throw away the whole structure of abstract theory, devote a generation or more to the collecting of historical materials, and after that make a fresh start at generalizing. That uncompromising attitude provoked the great controversy over method. Should economics be a deductive or an inductive science?

While many of the accredited representatives of economics were wasting their time in this futile debate, a most unorthodox theorist was demonstrating how study of the evolution of institutions might be indissolubly joined with analysis of their workings. Karl Marx's *Kapital,* published in 1867, seems nowadays a curious mixture of Hegelian metaphysics, Ricardian economics, historical learning, and political propaganda. Doubtless Marx's alleged science was warped by his passionate desires, his theory shaped to suit a program, quite as much as was the case with his bitterest opponents. But Marx saw the central problem of economics in the cumulative change of economic institutions; he knew how to use contemporary documents as an effective supplement of economic theory if not as its basis; and he showed how vital economic theory becomes when it is attacked from this side, especially if the current processes of change are projected into the future.

Contemporaries were too much scandalized by Marx's conclusions to profit by his methods. Indeed they were so intent on refuting his errors that they could learn nothing in the process. It remained for younger men to whom his conclusions were an old story before they opened *Das Kapital,* to see the scientific possibilities in his way of working. But by the eighteen nineties, Sidney Webb in England, Werner Sombart in Germany, and Thorstein Veblen in Amer-

ica were studying the evolution of economic institutions in a scientific, as opposed to an historical or a propagandist, spirit. Further they were claiming that work of this kind is economic theory.

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This sketch of the way in which economics has grown by differentiation into several types has been too brief to develop the full complexity of the present situation. There are types of theory of which I have said nothing and there are varieties within each type I have not noticed. But even on the present showing we have several kinds of economists—neo-classicists like Marshall, the American psychological school represented by Fetter, those who cultivate pecuniary logic like Davenport, and the champions of institutional theory like Veblen.

Which of these several types of theory shows most vitality today? Must we choose some one type to cultivate and discard the others, or is there some rational way of combining the contributions of all? What prospect has economic theory of progressing in the near future? Such are the questions I shall try to answer under a different set of captions in the last part of this paper.

III

THE FUTURE

1. RECONSTRUCTION AFTER THE WORLD WAR AND THE PROSPECT OF RENEWED VITALITY IN ECONOMICS

The war promises to give economics once again the vitality it had in Ricardo's day. That will be a marked change; for economics had settled into an academic discipline, cultivated by professors and neglected by men of action, modest in its pretensions to practical usefulness, more conspicuous for consistency and erudition than for insight, hated by few and feared by none. Even the Marxian socialists had become respectable, professing an orthodox creed and practicing an opportunist policy. Nowhere outside of Germany did economists play an active rôle in shaping public policy, and in Germany they were intrusted merely with certain details of imperial state-craft. There is doubtless a connection between the emergence of the later types of economic theory and the development of public affairs; but that connection is not obvious like the emergence of Ricardo's theory of distribution from the corn-law struggle. As economic theory had got to be further removed from contemporary problems it had lost

much of its early intensity, and become "sicklied o'er with the pale cast of thought." For years Ricardo and Malthus had bombarded each other with long letters about their theoretical differences, for on those subtle differences they saw dependent grave issues of national policy. In June, 1914 there were probably no two men in all the world who took their quest of economic truth with such seriousness.

When war broke out, however, the nations found that economic efficiency was a matter of life and death. The first shock forced governments and business interests to concoct immediately novel expedients to save credits from disruption. Presently all the large questions of war-financing had to be faced—how much to borrow and how much to tax, how to adjust the burden of taxation, and how to manage the currency. Then it became clear that victory required drastic economic mobilization of all available resources to maintain military efficiency and civilian morale. It was not merely a problem of getting money with which to buy goods, but a problem of organizing agriculture and industry, shipping and railways, of training labor and making inventions to procure the necessary amount of food, clothing and munitions.

Economists in every belligerent country had a share in framing the many measures for mobilizing resources. They were called in as technical advisers for the most part, but some among them became responsible officials. Both executives and advisers were plunged into a situation where they had to think constructively about economic institutions. They did a vast amount of strenuous planning, and tried to change the institutions of their several nations even more radically than they succeeded in doing.

What developments of economic theory has all this experience produced? Not much as yet on which one can put his finger beyond monographic books and articles. And there are those who expect no more than this to emerge. Economics, they say, will not change because the kind of theory we had in 1914 proved adequate to the demands made upon it. I cannot accept this view. The war-times were too full of emergencies to permit of calm reflection, still less did they permit free writing and publishing. But the next few years should harvest heavy crops from the sowing of the war. For the influence of the war on systematic thought is not over; indeed the war is just beginning to make its influence felt in the slow-moving social sciences.

The problems of reconstruction thrust upon us by the war offer as strong a stimulus to original analysis today as the reconstruction

problems of 1815 offered to Ricardo and his circle. Europe's need of adapting her institutions to fit the altered conditions is far more pressing, but it is clear that changes must come in the United States as well—changes that call for intelligent planning. Public finance bristles with difficulties—shall we try to collect the loans to our recent Allies, shall we seek to reduce the domestic debt rapidly, shall we maintain the heavy supertaxes on large incomes, can we make the federal budget a real scheme of control, are our public expenditures too large a fraction of our national income? The terms under which the railways passed back to private operation satisfies no one; how can we provide inducements for the new capital investments that are required, pay adequate wages and yet keep freight rates moderate? The war almost stopped immigration; after the war we imposed hasty legal restrictions upon the expected inrush of Europeans; what policy shall we adopt, now that we have time for sober second thoughts? What shall we do with the huge amount of shipping which we acquired during the war? Shall we continue to export capital on a grand scale? Can we maintain our traditional tariff policy without thwarting our commercial ambitions? This list of problems bred by the war need not be completed; it is long enough to suggest how varied and how searching are the demands that will be made upon the constructive capacity of economists.

Not only has the war left us a legacy of problems through which we must flounder or think our way; it has also left us an example of bolder action in the common interest than we had been accustomed to consider. Thousands of men who participated in the work of the War Boards learned to think in terms of the nation's needs, to collect quantitative data as a guide to their planning, and to effect a strange blending of government and private initiative in the measures they adopted. This bold spirit has not wholly vanished. Our more competent public men and our more aggressive private citizens face their problems with an imaginative vigor that would have shocked a larger portion of the community in 1914 than it shocks today. And so our economic problems that were not begotten by the war are coming in for re-consideration. There is promise that the government and private agencies in conjunction will see and attack the problem of controlling the business cycle. A more constructive attitude will animate our dealings with large-scale business enterprises. We shall become better conservators of our natural resources. We shall study economic wastes of various sorts and strive to diminish them. We shall learn more about the size and distribution of our national income, and shall evolve a more definite policy

toward both the conflicts and the unity of interests that center here—a policy that will be felt in labor unions and employers associations as well as in legislatures.

The conditions under which these problems new and old will be treated in the days to come promise to be more favorable to scientific fruitfulness than were conditions during the war. Then, it was often more necessary to settle a question promptly than to solve it correctly. Despite our national impatience this pressure for off-hand decisions has relaxed. We can take time to assemble data, to analyze them, to weigh the relative importance of different factors, and to study the bearing of each problem on the others. Decisions will not be left so largely to a small group of executives as they were during the war. In many issues appeal must be made to voters; in others legislators and officials will seek support from competent opinions of many kinds before accepting the responsibility for a decision. Most of the economic analyses made during the war were jotted down in hasty memoranda, read by a few officials and then tucked into filing-cases. We shall return perforce to the practice of publishing the grounds of action, and economic literature will profit. Finally, the ultimate criterion by which economic policies are judged will cease to be military efficiency and become, at least in name, civilian welfare. That shift will make solutions more difficult to reach, but also far more interesting to the economist.

2. ECONOMICS AS A SCIENCE OF BEHAVIOR

So far the argument has been rather obvious. We certainly face difficult economic problems, old and new. Certainly the economists will have a chance to show what they can do in a constructive way; working conditions favor their efforts: it will be strange if economic theory as well as economic practice fails to benefit. But we may go beyond these quasi-certainties into a more interesting range of possibilities, and forecast some of the ways in which economic theory will change as it grows.

Of widest significance among these changes will be a firmer grasp upon the fact that economics is a science of human behavior. That conception will give the valuable contributions of past theorists their proper setting and afford a framework within which the diverse contributions of the future will find their proper places. It will show that economic history, economic theory and applied economics have close organic relations, and it will dispel the darkness that has shrouded the relations between economics and the other sciences of behavior—psychology in particular.

As soon as an economist has assimilated this idea that he is dealing with one aspect of human behavior, he faces his share in that problem so conspicuous in current psychology, nature and nurture, the propensities with which men are born and their modifications in experience. I do not imply that the economist must read all the literature upon instincts and repressions which the psychologists publish. Doubtless acquaintance with that literature is helpful; it suggests a wide variety of hypotheses, and it makes one critical of the naïve theories about the human mind which each mind proffers in profusion. But we do not get very far with academic disquisitions upon instincts, or with general discussions of balked dispositions. They are at best a starting point for more serious work. And the economist has constructive work to do upon his aspect of behavior which the psychologist can but help him to set about in an intelligent way.

Phychology itself makes most rapid strides when it deals with a concrete problem. The economists and psychologists share many such problems—for example, the problem known as "industrial relations." In this field the competent investigator finds an especially promising opening for work:—he can get excellent facilities for investigation; predecessors have left him working hypotheses to develop; the problem is clarified by the formal organization of the opposing interests, by the standardized behavior demanded by machine tending, the standardized reactions of the workers, and by the repetition of the same situation with instructive variations in a thousand plants. When a human situation gets organized in this fashion half the theorist's work is done for him. Adam Smith could make a great advance upon earlier economists because the economic life of England in his day was taking on a definite and fairly uniform pattern. Ricardo could formulate a theory of rent because the relations between landlord and tenant were taking shape as a business contract. So in our turn we should be able to analyze effectively the problems of industrial relations, because the underlying facts are crystallizing of themselves.

Many economists think psychology useless, because it is introspective and subjective. When they grasp the idea that their business is with behavior, and that behavior is objective they will see that their psychological footing can be made secure. Indeed, one of the developments to be looked for is the rapid application of statistical technique to the study of demand for commodities, to the measurement of fatigue, to saving and other aspects of behavior which have seemed particularly baffling because particularly subjective. Psychological

facts that can be measured are better data for science than most of the materials the economists have utilized in the past.

While fresh fields will thus be brought into the economist's demesne, he will find that his old fields of work gain new fertility from his new way of working. It will become evident that orthodox economic theory, particularly in the most clarified recent types, is not so much an account of how men do behave as an account of how they would behave if they followed out in practice the logic of the money economy. Now the money economy, seen from the new viewpoint, is in fact one of the most potent institutions in our whole culture. In sober truth it stamps its pattern upon wayward human nature, makes us all react in standard ways to the standard stimuli it offers, and affects our very ideals of what is good, beautiful, and true. The strongest testimony to the power and pervasiveness of this institution in molding human behavior is that a type of economic theory which implicitly assumed men to be perfectly disciplined children of the money economy could pass for several generations as a social science. The better orientation we are getting will not lead economists to neglect pecuniary logic as a sterile or an exhausted field. On the contrary not only will it make clear the limitations of the older work but it will also show how the old inquiries may be carried further, and how they may be fitted into a comprehensive study of economic behavior.

So also, the numerous special branches of economics, which have recently become sharply differentiated, will gain more from economic theory and contribute more to it as that theory takes on a realistic, quantitative form. For many years there has been a notable difference between the way in which economists handled economic theory on the one hand and the way in which they handled such problems as transportation, public finance, tariffs, money, banking, insurance, trusts and labor on the other hand. The monographs made little use of the theoretical treatises, and the treatises drew upon the monographs for little beyond illustrations. Text books often had a theoretical part and an applied part held together by nothing more intimate than the binding. When, however, economic theory is made an account of the cumulative change of economic behavior, then all studies of special institutions become organic parts of a single whole. The viewpoint of the man who writes on railroad rates becomes that of the man who writes on the economic life of the ancient Greeks and that of the man who is concerned with the process of valuation. Thus economic theory will cease to be a thing apart from applied

economics, because economic theory itself will deal with genuine issues—the kind of issues that are now discussed in monographs.

3. THE SIGNIFICANCE OF INSTITUTIONS IN ECONOMIC BEHAVIOR

As we work with the conception that economics is a science of behavior, we find our attention focussing upon the rôle played in behavior by institutional factors. That idea has been suggested casually in the preceding sections; the reason for it should be made clear.

In economics as in other sciences we desire knowledge mainly as an instrument of control. Control means the alluring possibility of shaping the evolution of economic life to fit the developing purposes of our race. It is this possibility, of which we catch fleeting glimpses in our sanguine moments, that grips us. Always the center of our interest lies in the changes that have taken place in economic behavior, the changes that are now taking place, the changes that may take place in the future.

From all that we know about the history of our race it seems probable that the equipment with which men are born alters little if at all through millenniums. Our reflexes, instincts, and capacity to learn are believed to be substantially the same as those of our cave-dwelling ancestors. If our lives are radically different from theirs, it is because we have developed through a long process of cumulative change more effective ways of training our native capacities. We have acquired certain ways of dealing with each other and with material things that are roughly standardized and taught to our children—ways of behaving that have their aspects of feeling, thinking, and willing. It is these widely prevalent social habits, learnt afresh with modifications by each generation, that make our behavior so different from that of our ancestors, and that will make the behavior of our descendents different from ours.

Accordingly, it is in these habits that the student of economic behavior finds his chief problems when he studies the past or the present, and his chief hope when he thinks of the future. "Institutions" is merely a convenient term for the more important among the widely prevalent, highly standardized social habits. And so it seems that the behavioristic viewpoint will make economics theory more and more a study of economic institutions.

Throughout the nineteenth century it was possible to assume with Ricardo that economic organization had attained a permanent form. Robert Owen's socialism was verily utopian, John Stuart Mill's ex-

pectation that coöperation would spread rapidly proved a genial delusion, the processes which Marx saw undermining capitalism failed to work as he prophesied. Alfred Marshall seemed justified in taking as the motto of his treatise, *Natura non facit saltum.* Changes in organization did occur; indeed the current of change was swifter perhaps than in any preceding century. Yet with their astonishing capacity for not seeing what they were not looking for the economists could treat these changes as negligible in their analyses. In the world thus made stable, the economist's business was merely to analyze the workings of existing institutions. An historian it was admitted, might gratify idle curiosity by tracing the tortuous process through which economic organization had reached its final shape; but the economic theorist should stick to the serious task of understanding the present and not bemuse himself with speculations about the past or the future.

Darwinism with its picture of the whole universe as evolving through a process of cumulative change which has no final term disturbed this orthodox tradition, though the economists with their wonted deliberation took more than a generation to grasp the significance for the social sciences of Darwin's work. Nor did the men who sought to make economics an evolutionary science produce much impression on their fellow workers. Biological evolution as Darwin pictured it was a process of change infinitely slow, and the fact that the evolution of institutions proceeds far more rapidly was not brought home to most economists with convincing effect. By the time formal recognition was won for the evolutionary viewpoint in the social sciences, Darwinism had become outworn theology to alert biologists and Gregor Mendel had been rediscovered. In 1914 the institutional type of economic theory was still a rare form of mental aberration, to which few but the young succumbed and from which most victims made a prompt recovery.

Catastrophies, the anthropologists say, have been the potent factor in social change, the great provoker of social thinking. So it was with the war. Western civilization was not so solidly crystallized but that the belligerent nations could readjust their institutions promptly and considerably, under the intense pressure which they suffered. The institutional changes then effected, though intended to be temporary, have made a deep impression upon thoughtful minds, and shifted the perspective in which men see the future. Even in days of reaction, we cannot regain implicit faith in the stability of our prewar institutions. We cannot forget the national program of economic mobilization which was just emerging from the earlier

chaos in Washington when the armistice was signed. We cannot shut our eyes to the greater changes that happened in Europe—the overthrow of dynasties in the Central Powers, the Soviet Revolution. And both those who hope and those who fear keep speculating about the further changes in prospect—the possible admission of bankruptcy in France and Italy, the growing power of the labor party in England, the doubtful stability of the present régimes in Germany and Austria, the portentous awakening of Asia. Living amidst such uncertainties we cannot be content with an economic theory of the "static state," except in moods when we long to escape from stern reality into a romantic world. The generation that is rising will accept as "scientific" only those theorists who make the cumulative change of institutions their chief concern.

4. QUANTITATIVE ANALYSIS

Of course it is mass behavior which the economist studies. Hence the institutions which standardize the behavior of men create most of the openings for valid generalizations. That was true even in Ricardian economics, when the generalizations were made by the treacherous method of reasoning on the basis of imputed economic motives. A much more dependable set of generalizations can be attained as rapidly as objective records of mass behavior become available for analysis. The extension and improvement of statistical compilations is therefore a factor of the first consequence for the progress of economic theory. Gradually economics will become a quantitative science. It will be less concerned with puzzles about economic motives and more concerned about the objective validity of the account it gives of economic processes.

One of the outstanding lessons of the war to all economists who had a share in planning, was the indispensable necessity of carrying their analyses beyond the stage represented in orthodox treatises. It seldom sufficed to say that a given action would have consequences of a certain kind, that would have been easy—and trifling. The important thing was to find out at least in what order of magnitude these consequences should be reckoned. Continually grave decisions turned on the questions: how many? how much? how soon? Say that the limiting factor upon our military effectiveness in France was ships—ships to carry troops and munitions. Then we should put all the available tonnage under army control. And it was wasteful to recruit and train more soldiers or to make more materials within a given time than these available ships could carry. But how large a force would each thousand tons maintain in France and how many

thousand tons were available for army use? The available tonnage depended partly on how soon the new shipyards could get their vessels finished, partly on how much tonnage we could acquire from neutrals, and partly on how much tonnage was needed to provision the allies and to bring us necessary imports. What imports, then, were necessary? That again was a quantitative problem of almost infinite detail. We might cut down the output of tires for pleasure automobiles, for example, but we needed a great deal of rubber for military and for essential civilian uses. Just how much did we need, just how much was already in stock, just how much more crude rubber should be imported each month, and where could we get it with the shortest voyages? Such questions came up—literally by thousands—and they had to be answered in figures, figures drawn from official records if there were such, figures carefully estimated if there were no records, figures intelligently guessed at if there was no real basis for an estimate.

In the economic problems of peace this quantitative element is not less fundamental than it was in the problems of the war. Here, indeed, is one of the differentiating characteristics that set off the problems that crop up in real life from those which appear in books. The theorist discoursing at large may content himself with pointing out the kinds of causes and consequences to be considered; the practitioner dealing with specific cases must calculate the magnitudes involved. In proportion as economists face real problems they will strive to cast even their general theory into the quantitative mold.

In so doing they will derive a deal of help from the statistical work which was done during the war, and which will be kept going or will be taken up again as the problems of peace are faced in earnest. For example, to help the price-fixing authorities the Federal Trade Commission made careful and elaborate studies of the cost of producing staples like coal and iron in different plants. Their figures give clearer insight than we ever had before into one of the oldest topics of economic disputation. So, too, the distribution of income is better known because of records of Internal Revenue. We are getting fuller data concerning the output of commodities; the Federal Reserve Board promises to measure the fluctuations of credit; studies in the physical productivity of labor are becoming feasible; some light has been shed on the volume of savings; statistical records of business cycles are being refined. And so on through a long list.

Moreover, officials, business men, and philanthropists are coming to see that they cannot depend safely upon "hunches" in guiding policy—they need to know the facts before they act. This growing

interest in economic fact is not a conjecture, it is proved by the recent establishment of a number of organizations for social research. The Harvard Committee on Economic Research, the Wharton School's Bureau of Economic Research, the National Bureau of Economic Research, the Bureau of Industrial Research, the Labor Bureau Incorporated, the Institute of Economics, the Food Research Institute, the bureaus of business research created in several universities and the far larger number of statistical organizations set up by business corporations and trade unions are significant signs of the times. It seems likely, indeed, that the endowment of economic research will become as favorite an enterprise of public spirit as the endowment of medical research. With materials from all these sources to aid them, the economists will find it far easier than ever before to carry their theoretical analyses forward to the quantitative stage.

5. THE PROBLEM OF PRODUCTION

Another change that will come over economics is the recession of the theory of value and distribution from the central position it has held ever since the days of Ricardo to make room for the theory of production.

Quantitative analysis will be largely responsible for this change in emphasis. For recent studies of income not only make our present knowledge of the inequalities of income more precise, but also throw into high relief the inadequacy of the aggregate national income. It seems that even if the national income were divided equally among all inhabitants of our country—and our country has presumably the highest per-capita income in the world—American families would still lack the means for a satisfactory life. If these results are valid, the fundamentally important problem is how to render production more efficient.

That problem is one that calls for many-sided coöperation. The physicists, chemists, and biologists are the men whose work lies at the basis of our struggle with nature. In the last resort, the fate of mankind hinges on the duel between science and the atom, as Professor Soddy picturesquely puts it. We must look to the engineering profession in its numerous branches to bring our industrial equipment and industrial processes abreast of our technical knowledge. The psychologist must take a larger share in selecting men for jobs, in training them, and in rearranging working conditions to evoke more energy from the workers. But, after all these specialists and others have done their best, plenty of work will remain for the economists.

They must find out a great deal more than is known at present about waste. Just what benefit do Americans as a whole gain from all the effort they spend on advertising? The commercial process of getting goods from manufacturers to consumers has not been greatly improved since 1800. Is there no possibility of a Commercial Revolution comparable with the Industrial Revolution in importance? Why should a nation that needs useful goods suffer periodically an industrial depression in which men and machines stand idle by tens of thousands? To give full scope to modern engineering technique, production ought to be organized on a continental scale. Every industry ought to be carefully adjusted to every one of the industries with which it interlocks, so that the processes of making useful goods may run smoothly from the production of the raw materials to the delivery of the finished product at the door of the ultimate consumer. But there are economic obstacles in the way of meeting these technical demands. We are afraid of that very process of integration among industries which is necessary to make them mechanically efficient, and rejoice when our government dissolves the Standard Oil Company and forces the packers to give up their side lines, though by so doing it increases systematic waste. Economists must attack this whole problem of combining protection to the consumer with organization of production on a scale larger than is yet attempted.

To do that effectively, they must make a realistic analysis of present-day production. They must study the problem of distribution itself from the viewpoint of production, seeking to find out the bearings of inequality of income upon savings, personal efficiency of workers and employers, industrial depressions and the like. This work will require courage, both because the American public at large distrusts huge organizations, and because powerful private interests would be threatened by organization for efficiency. But the problem is susceptible of treatment by quantitative methods on the basis of data in which the margin of error can be approximately measured. Where scientific work is possible there is slight excuse for hesitation. Public attention is already being called to the alleged possibility of increasing output of useful goods several fold by systematic planning of all production, and it seems likely that agitators will make much of this claim in the future. That is all the more reason why engineers and economists should work soberly in conjunction to determine what wastes of commission and omission are inherent in our present system of production, and how they may be eliminated without introducing new wastes of greater magnitude.

This last clause points to an obvious problem which the sanguine reformer is prone to slur over. Would not organization of production on a continental scale necessarily involve bureaucratic control over production, and would not bureaucratic control lead to a new type of inefficiency worse than the old? The answers we now give to this momentous question are based mainly on speculative opinions which get their color from our prejudices or casual experiences rather than from knowledge. We need careful quantitative analyses of efficiency under various conditions, before we can say with assurance what the margin of waste is under government as compared with corporation management, and before we can say how far the causes of present government inefficiency are eradicable.

6. THE TREATMENT OF WELFARE

Yet one more phase of the change that is coming over economics may be predicted. In becoming consciously a science of human behavior economics will lay less stress upon wealth and more stress upon welfare. Welfare will mean not merely an abundant supply of serviceable goods, but also a satisfactory working life filled with interesting activities.

At present welfare thus conceived is rather vague, but it is capable of being made objective and definite in reference to such matters as food, clothing, shelter, sanitation, education, fatigue, leisure. And this realm of the definite in welfare will be expanded steadily by quantitative methods, so that we shall develop a criterion of welfare applicable to many lines of effort. Intensive studies of production will show not merely how the output of fields, mines and factories can be increased by better organization, but also how the human cost of production can be diminished. The idea of cumulative change in institutions will prepare us to try experiments intelligently. Industrial relations will be studied not merely to find how strikes and lockouts can be avoided and individual efficiency raised, but also to find how work itself may be made interesting to the mass of the workers.

Let me give one concrete illustration of this change. To the classical theorists production was a painful process which men performed solely to attain the pleasures of consumption. By the curse of Adam or by the laws of nature, as you please, man was condemned to eat his bread in the sweat of his brow. That was a hard fact which the economist had to accept and use in explaining other facts. It was not a fact that he need investigate or that he might hope to modify. What hope there was lay in enhancing the output of

goods or in limiting the population, not in making the process of production pleasant.

The utility theorists took the same view, except that they emphasized the variations in the irksomeness of labor during the working day. After work had been fairly started it might be positively pleasant for a time, and so long the worker gained both the pleasure of exercise and the pleasure of having products to consume. This fact, however, might be set aside once it had been mentioned. For the factor that helped the economist to explain prices was the marginal sacrifice of labor—the sacrifice made in the most difficult hour of the working day. That sacrifice was taken for granted and the economist passed to other problems.

In this field so lightly tilled there is a deal of work to do. That work may start with Veblen's naïve question, Why is labor irksome? He has shown that man has an "instinct of workmanship" which finds satisfaction in the skillful performance of a job, and dissatisfaction in waste of good materials or waste of effort. He has suggested that our feelings which contradict the instinct of workmanship, pride in "conspicuous waste" and disesteem for manual labor, may have no more permanent foundation than a set of institutions which make riches the chief criterion of success in life. Is that true? If it is true, is it the whole truth? May not the conditions of work imposed by the machine process be repugnant to the kind of human nature we inherit? But if they are repugnant is there nothing more to be done? Can we not find ways of adjusting work and workers so as to lessen the irksomeness of labor if not to make it attractive, "energizing" instead of "enervating" in Dean Schneider's phrase?

A practical movement will drive these questions home. In this country and still more vigorously in England the working classes are insisting with new vehemence on the old truth that labor is not a mere commodity to be counted among the costs of production like the coal burned in the factory furnace. For labor cannot be separated from the laborer and the laborer is a citizen who believes he has rights to as satisfactory a life as anybody else. These rights he seems minded to enforce by peaceful methods if they suffice, perhaps by violence if that proves necessary. He wants not merely good wages and leisure hours, but also a share in the management of industry to secure satisfactory working conditions, and to gratify his craving for power.

Between such demands and current conditions there is a great gulf fixed. That gulf can be bridged only by scientific social en-

gineering. In making and trying designs for this bridge men of constructive imagination among the employing class and among the working class will play the most active rôles. But the professional students of the social sciences will also have a share in the work. Men have an extraordinary variety of aptitudes in detail; different jobs call for the most diverse qualities of mind and body. It is necessary to analyze both men and jobs with care to find the capacities of the first and the requirements of the second. If that can be done with success, it should prove possible to place a large part of the workers, perhaps, in the end, all the workers, in jobs that will give ample scope to their faculties without overstrain. Then the average factory operative may get as much satisfaction from his job as the average professional man now gets, provided always that in the processes of change we shuffle off our conventional disdain of manual labor.

Such a consummation is one of the working ideals that economists will come to cherish. They will think of production not merely as a process of making goods, but also as a set of human activities in which the workers are being cramped or being developed. They will be even more concerned with what man does than with what he gets.

. . . . . .

At the beginning I said that the prospect of making progress in economics is bright, that we seem to be entering upon a period of rapid theoretical development and of constructive application. My reasons for that faith are now apparent. The grave problems of the war and of reconstruction will restore to economic theory the vitality it had after the Napoleonic Wars. In dealing constructively with these problems economics will develop rapidly on the quantitative side, it will lay increasing emphasis upon the production of serviceable goods, it will focus its attention upon the cumulative change of institutions, it will realize that it is one of the sciences of human behavior, as such it will become less the science of wealth and more the science of welfare, from this new viewpoint it will gain clearer insight into its relationship to other sciences, its past accomplishments and its future tasks.

All this is full of promise. But I must add that the task of the social sciences is supremely difficult, that progress will be chequered, that the particular changes I have prophesied in economic theory may not take place, that our generation may pass before men find a really fruitful way of attacking economic problems. How all will go we cannot foresee. Yet if we do the work of today and tomorrow

according to our lights we shall at least be helping on that long process of trial and error by which mankind is striving toward control over its own doings. A chance to share in this work with its exacting demands, its frequent disappointments, but its thrilling possibilities is open to all who will.

ON MEASUREMENT IN ECONOMICS

by

FREDERICK CECIL MILLS

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ON MEASUREMENT IN ECONOMICS

1. INTRODUCTION

The present has been termed "the inductive era" in economics. Whether the phrase be strictly justified is perhaps a matter for question, but certainly the emphasis on the factual aspect of economic study is every year more pronounced. For the economist of today facts constitute not only the ultimate test of theory but, probably to a greater conscious extent than formerly, facts constitute the raw material from which theories are to be cast.

This study of specific facts has been accompanied by an increased use of quantitative methods. The modern economist enumerates, measures, weighs. He seeks that accuracy and precision in dealing with facts, that power of exact description, which the ability to measure conveys. "When you cannot measure what you are speaking about, when you cannot express it in numbers," said Lord Kelvin, "your knowledge is of a meager and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the stage of a *science*, whatever the matter may be." The attempt to measure has been made in almost every field of economic interest. Precise methods have been developed for measuring changes in the general level of prices. By means of index numbers of various types changes in such varied and complicated phenomena as wage levels, the volume of production, the volume of trade, stock prices, and the cost of living are expressed in quantitative terms. These diverse applications have fully demonstrated the fruitfulness of quantitative methods, both for the testing of hypotheses and for the inductive derivation of new generalizations. The future development of economics as an effective instrument of social control will undoubtedly be conditioned largely by the use made of these tools.

The extensive employment of quantitative methods in economics, involving as it does the application to economic data of tools developed in other fields for other purposes, calls for some consideration of the logical assumptions involved in the use of these methods, the validity of applying them to the data of economics, and the precise significance of the results secured. The present paper is con-

cerned with certain logical problems arising from the application of these methods in economic research, with particular reference to the nature of our knowledge of economic events, the nature and significance of economic generalizations, or "laws," and the possibility of deriving such laws by processes of quantitative induction. This may be considered as merely a preliminary discussion of many of the points raised. The main purpose in mind is to call attention to the practical importance of certain problems which must be faced if economics is to secure a sound quantitative foundation.

2. THE STATISTICAL CHARACTER OF USEFUL KNOWLEDGE

No discussion of method is significant unless it proceed from a consideration of the nature of the matter to be manipulated. As a mechanic chooses a tool adapted to his material, so the economist must adapt his methods to his data. What are, then, the data of economics? What is the character of the materials of economics, and what is the nature of our knowledge of them? If we can answer these questions, we shall be in a position to consider the instruments of measurement which may be employed.

Clerk Maxwell, the physicist, has set up a classification of scientific knowledge and of scientific method, a classification elaborated by Josiah Royce, which has particular significance for the economist. The division, essentially as explained by Royce,[1] is as follows:

All scientific knowledge may be catalogued as *historical, mechanical* or *statistical.* That knowledge is *historical* which has as object the individual event—a solar eclipse, a sunrise, a single physical fact, or any single act of an individual. The *historical method* is one which concerns itself with single events, which studies individual organisms, the history of individual organisms, or the sequences of individual events. That knowledge is *mechanical* which deals with "the invariant laws to which all individual events of some field of inquiry are subject." The *mechanical method* concerns itself with such unchanging laws, and with individual events which are completely predictable from knowledge of such laws. *Statistical* knowledge is that having as object "not the single event and not the invariant law, but . . . the relatively uniform behavior of some average constitution, belonging to an aggregate of things and events, and the probability that this average behavior will remain, within limits, approximately, although always imperfectly uniform." The *statistical method* is that which deals with assemblages or groups in

[1] "The Mechanical, the Historical and the Statistical," *Science*, N. S. xxxix, No. 1007, April 17th, 1914.

terms of the averages by which they may be described, and which deals with relations which are not described by unchanging laws but by generalizations couched in terms of approximation and of probability.

Our knowledge of nature is of which of these types? To this fundamental question both Clerk Maxwell and Royce give an unequivocal answer.

"Our actual knowledge of concrete things," writes the former, "is of an essentially statistical nature." We cannot, from the very nature of the case, trace the path of a molecule, or identify it at different times. "Hence those uniformities which we observe in our experiments with quantities of matter containing millions of molecules are uniformities . . . arising from the slumping together of multitudes of cases, each of which is by no means uniform with the others."[1] If knowledge of individual things and events is impossible when dealing with fundamental material units, invariant mechanical laws obviously cannot be applied to them. Purely mechanical as well as purely historical knowledge is, therefore, in practice, unobtainable. "The scientific view of nature is thus . . . neither purely historical nor purely mechanical, it is statistical." As a proof of the practical validity of this view Clerk Maxwell developed the atomic theory of gases, a theory derived from the logic of probabilities as applied to the velocities and the collisions of millions of hypothetical molecules.[2]

Josiah Royce goes even farther than Clerk Maxwell in stressing the dominant importance of the statistical view of nature. The three fundamental conceptions of this view (that of an average, that of approximation, and that of probability), he says, "are indeed not the only fundamental categories of our thought, but they are conceptions which go down to the very roots of our intelligence as well as of our voluntary activity. . . . They . . . go down to the roots of that nature of things which our sciences are studying."[3] "Not the mechanical but the statistical form," he concludes, "is the canonical form of scientific theory."

The implications of this view are far-reaching. It means that,

1 Campbell and Garnett; *Life of Clerk Maxwell*, quoted by Merz, *History of European Thought in the Nineteenth Century*, II, 600–601.

2 "The distribution of the molecules according to their velocities is found to be of exactly the same mathematical form as the distribution of observations according to the magnitude of their errors, as described in the theory of errors of observation." Clerk Maxwell, *Theory of Heat;* quoted by Royce, *loc. cit.*, 560.

3 *Loc. cit.*, 559.

practically, knowledge of individual things and events in nature is impossible, that we must perforce deal with averages, and with "the total effects produced by an immensely large number of singly imperceptible events." Whether we are concerned with matter and the physical problems relating thereto or with social and economic events, the coarseness of our senses and the limitations of our intelligence prevent us from perceiving and dealing with individual things or occurrences. We deal with composites, aggregates, groups. We do so, moreover, not only because precise knowledge of individual units is impossible, but also because it is not the individual but the aggregate of things or events, as known through their combined effect, which has scientific significance for us. The ultimate constituents of matter—electrons, atoms, molecules—are of interest to us only in the way in which, in combination, they affect our senses. We seek to understand their nature for the light it will throw upon their behavior in mass, as that behavior affects the matter with which our senses deal. The innumerable events which, in aggregate, constitute a social phenomenon are neither individually known to us nor individually of interest to us.[1]

All this is a matter which concerns us not as a problem in epistemology but in its practical relation to current scientific questions. Certain aspects of this view of nature should be emphasized because of their bearing upon economic problems.

One point of sharp contrast between the mechanical and the statistical views relates to the existence of individual *variation* in nature. The mechanical conception involves the notion of *sameness*, of the precise identity of all the things or events described by a given law. The statistical view assumes no such similarity of the individual objects constituting the aggregates which are of interest to us. We treat them as statistically similar, but recognize the existence of individual differences. The importance of variation in organic forms has been acknowledged; the failure to perceive differences, and the persistence of the mechanical view as applied to other forms, may be due merely to the inadequacy of our powers of discrimination. "Absolute sameness," says Karl Pearson," is a purely conceptual notion which is not in human experience, but which has been extracted from that experience in the same manner as other conceptual limits."[2] Whether this concept of variation be

[1] The limitations of statistical knowledge, as regards individual objects or events, have been emphasized by Raymond Pearl, *Modes of Research in Genetics*, 73–100.

[2] *The Grammar of Science*, 3rd ed., 153.

valid as applied to the final constituents of matter need not concern us. In dealing with social and economic phenomena the existence of variation and the consequent inapplicability of the mechanical method must be recognized.

If there be no sameness in nature except that which is due to our own limited powers of discrimination, if our knowledge be limited to knowledge of aggregates and of mass phenomena, there can be no *certainty* in our knowledge of nature and in our generalizations about the relations between things and events in nature. Our knowledge of the individual event must always be inadequate and incomplete; uncertainty and doubt can never be dismissed from our minds. An element of probability must be present in all our reasoning. "Perfect knowledge," Jevons writes, "alone can give certainty, and in nature perfect knowledge would be infinite knowledge, which is clearly beyond our capacities. Therefore we content ourselves with partial knowledge, knowledge mingled with ignorance, producing doubt." This conception of uncertainty and probability in our knowledge of nature is an essential accompaniment of the statistical view, and here again it is at odds with the mechanical concept. The latter assumes perfect knowledge and no variation. "The equations of dynamics completely express the laws of the historical method as applied to matter, but the application of these equations implies a perfect knowledge of all the data."[1] Where we come nearest to securing such complete knowledge, as, perhaps, on the subject of planetary motion, practical certainty is attained and the element of probability in applying the equations of dynamics may be ignored. A solar eclipse may be foretold with a negligible margin of error. Such certainty, however, represents but a limit, and a limit never attained in our actual knowledge of social phenomena, though we may approach it in our knowledge of the physical world.

Since our knowledge of nature is primarily statistical, and therefore "mingled with ignorance," and since generalizations of the mechanical type imply a perfect knowledge of all the data, which is seldom, if ever, to be had, we are confronted with a question as to the validity of all generalizations purporting to explain sequences or relationships. May such general statements be made in a world in which all knowledge is accompanied by doubt? And if made, how shall we determine their reliability, how measure the degree of doubt attaching to a given generalization? Problems of vital interest to the economist are raised by these questions.

[1] Clerk Maxwell. Quoted by Merz, *loc. cit.*, 602.

The term *law* has been applied to any general proposition dealing with the relationship between things or events. So understood, it implies nothing compulsive, nothing active, nothing invariable, but such meanings are not infrequently read into the term. Natural laws are often spoken of as though they were active forces, ruling the universe with imperious sway. Of the same order has been the attitude often taken toward the laws of economics; they are viewed as mysterious forces which govern man's conduct in the industrial sphere, principles which must never be transgressed. Such a view of law, whether natural or social, is, as Dewey says, an animistic survival. A law, as the scientist sees it, does not govern. It is a summary of observed relations, "a brief *résumé* of experience," "a shorthand symbol" which assists in the understanding of a number of related phenomena. Laws are generalizations, not forces.

But not all generalizations are of equal validity. And herein lies the distinction between the mechanical conception of law and that conception which is consistent with the statistical view of nature. According to the mechanical conception, a law is a generalization which is universally true, a description of an invariant relationship. It is implicit in this concept that causal relations are specific, determinate, and of the order of certainties. Effect and cause are linked by iron necessity, unvarying, universally the same. Since such generalizations deal, of necessity, with individual cases, it follows that mechanical laws assume the historical type of knowledge. Such laws are not concerned with averages or probabilities, but with unvarying relationships, holding for every instance. A single exception, a single "obstreperous fact," and the generalization is invalid.

This concept of law is quite inconsistent with the statistical view of nature. In the world of practical events historical knowledge, knowledge of all specific instances or events of a given type, is not to be had. We must content ourselves with knowledge of averages, of types, that is to say, with statistical knowledge. But in generalizing with respect to such averages we cannot put our statements into the form of invariant mechanical laws, for our knowledge stops short of all individual cases. We can conceive of such laws, and of the relation of certainty which they imply, but their existence cannot be established by perception. Our generalizations must deal with trends, tendencies, average relationships, relationships which may lie anywhere along the scale from perfect independence to complete dependence. If the relation falls short of complete dependence, the generalization holds not with certainty, but with some degree of probability. In reality, most laws relating to the physical realm and all

laws dealing with social phenomena are of this latter class, describing relationships which do not hold universally, with absolute certainty. To adopt the mechanical view is to confine one's knowledge to but one limit of a whole series of possible relations, a limit so rarely attained in nature as to be virtually a pure concept, not a perceptual fact.

From the statistical point of view, therefore, the notions of invariant mechanical laws, of perfect causal relationship, of complete certainty, represent only extremes or boundaries. They are Pearson's *conceptual limits*, arising from the necessities of our thinking apparatus, rather than from our actual perceptions. In its attempt to find simplifying principles in a vast and complex environment the mind, with its "all too human love of certainty," conceived of relationships as thus direct and obvious—one cause and one effect. Such a conception has the merit of simplicity, but in its assumptions of absolute sameness and of invariant law it fails to accord with fact.[1]

In the light of this approach, therefore, we forego the searching for sole causes and, instead, seek to measure the degree of association found in experience between related phenomena. Not the isolation of first and only causes, but the determination of the degree of change in one factor associated with a given change in a correlated factor is the task with which we are generally confronted in a world organized on the statistical plan.

The generalizations which describe relations in such a world, moreover, are never looked upon as necessarily final formulations of truth. Scientific generalizations pass through stages of development, first approximations being improved upon by securing more comprehensive formulae with higher degrees of probability. Thus it would ap-

1 The following passage from J. M. Keynes is of interest in connection with the discussion of the statistical view of nature, particularly with reference to the character of natural laws:

"The kind of fundamental assumption about the character of material laws on which scientists appear commonly to act, seems to me to be much less simple than the bare principle of Uniformity. They appear to assume something much more like what mathematicians call the principle of the superposition of small effects, or, as I prefer to call it, in this connection, the *atomic* character of natural law. The system of the material universe must consist, if this kind of assumption is warranted, of bodies which we may term *legal atoms*, such that each of them exercises its own separate, independent, and invariable effect, a change of the total state being compounded of a number of separate changes each of which is solely due to a separate portion of the preceding state. We do not have an invariable relation between particular bodies, but nevertheless each has on the others its own separate and invariable effect." *A Treatise on Probability*, 249.

pear that Einstein, if his theories be correct, has not overthrown but has merely introduced a correctional factor into the Newtonian scheme. This process of growth, which can hardly be reconciled with a thorough-going mechanical view, is quite consistent with the statistical concept of law.

This whole conception of the essential problem in scientific study is most effectively summarized in the following passage from Pearson:

"That the universe is a sum of phenomena, some of which are more, others less closely contingent on each other is the conception, wider than that of causality, which we may at the present time draw from our widening experience. The aim of science ceases to be the discovery of 'cause' and 'effect'; in order to predict future experience it seeks out the phenomena which are most highly correlated. . . . From this standpoint it finds no distinction in kind but only in degree between the data, method of treatment, or the resulting 'laws' of chemical, physical, biological, or sociological investigations. They all provide, or should provide (i) a conceptual routine, which is a functional expression of average experience, and (ii) a measure of the possible or probable deviations from this routine, which is a guide to the amount of variation in experience. Because this is small in some physical experiences, it has been neglected as a matter of little practical value—a routine may vary even considerably without its upsetting conduct. But this neglect is no justification for the assumption that our conceptual routine, a product of the statistical treatment of experience, represents a real functional relationship at the back of phenomena. . . . There is always, in non-organic as in organic phenomena, a residual variation. . . . From this standpoint the universe appears as a universe of variation rather than as a universe controlled by the law of causation in its narrowest sense. No phenomena are causal; all phenomena are contingent, and the problem before us is to measure the degree of this contingency, which we have seen lies between the zero of independence and the unity of causation."[1]

The technical methods of measuring relationship when the tie is one of contingency and not of certainty need not be discussed here. The point to be emphasized is that these tools are of general scientific interest, that their potentialities are only suggested by the results so far secured in limited fields. They represent a fundamental change in the whole matter of looking at the problem of causal relationship, and an attitude toward natural and social laws which is

[1] *The Grammar of Science*, 173–4.

so far removed from the traditional view as to constitute almost a revolution in thought.

While this view of natural law and of the problem of causal relationship has been presented most clearly and with the keenest appreciation of its significance by Pearson, such a concept is implicit in the writings of other scientists, and has been explicitly developed by several authors. Clerk Maxwell's arguments in favor of the statistical view of nature lead directly to such a conception of natural law. All statements of *tendency,* Royce has asserted, are attempts to frame laws of this correlational type, but with no explicit statement of the probabilities involved. "The term, tendency," he writes, "is, in every exact usage which you can give it, an essentially statistical term. To say that *a* has a tendency to lead to *b* is to declare that a more or less certainly and definitely known proportion of events of the class *a* are followed by events of the class *b*." [1] And again "—the law for which the statistical method seeks is no longer a law that is ideally statable in terms of an invariant differential equation or in terms of any other timeless invariant. When found, the statistical law is an account of a collection of facts in terms of averages involving many events." [2] Jevons' attitude on the problem of causation is quite in accord with the views expressed above.[3] Of contemporary writers, Henry L. Moore has not only clearly described the essential characteristics of statistical laws [4] but has demonstrated the fruitfulness of the concept when applied to economic problems.

It is a noteworthy fact that this concept of the nature of laws is in complete agreement with the views of philosophers of the pragmatic school who approach the problem from quite a different angle. John Dewey speaks of generalizations as "not fixed rules . . . but instrumentalities for . . . investigation, methods by which the net value of past experience is rendered available for present scrutiny of new perplexities . . . they are hypotheses to be tested and revised

[1] Royce, *loc. cit.,* 559.

[2] *Ibid.,* 557.

[3] "I have no objections to use the words cause and causation, provided they are not allowed to lead us to imagine that our knowledge of nature can attain to certainty. . . . A cause is not to be distinguished from the group of positive or negative conditions which, with more or less probability, precede an event. In this sense there is no particular difference between knowledge of causes and our general knowledge of the succession of combinations in which the phenomena of nature are presented to us or found to occur in experimental inquiry." *The Principles of Science,* 226.

[4] *The Laws of Wages,* chap. I.

by their further working."[1] And elsewhere he writes, "Nature is not an unchangeable order, unwinding itself majestically from the reel of law under the control of deified forces. It is an indefinite congeries of changes. Laws are not governmental regulations which limit change, but are convenient formulations of selected portions of change followed through a shorter or longer period of time, and then registered in statistical forms that are amenable to mathematical manipulation."[2]

In summary: Our useful knowledge of events in the world about us is essentially statistical in character; that is, it is not concerned fundamentally with unique, individual events, but with aggregates of events which may be described in terms of averages, of typical characteristics. In generalizing about such aggregates we are of necessity precluded from speaking in terms of invariant laws. Such laws as may be formulated for the purpose of summarizing past experience must be formulated in terms of averages, and therefore assert not certain relations but only probable and approximate relations, insofar as individual events are concerned. Such a view of the nature of law involves a recognition of the purely imaginary character of the concept of causation, in the sense of a direct and perfect relationship between phenomena. Association and correlation are the terms which replace causation, as probability and approximation replace the concept of certainty.

3. Quantitative method and the laws of economics

In the light of this approach we may revert to the data, problems and methods of economics. The discussion above has not been concerned with the materials with which the economist deals, but it bears directly and significantly upon the problems of economics.

No attempt can be made here to classify the data of economics. The economist must concern himself with a complex variety of things and events—with births and deaths, with industrial technology and business practices, with tons of coal produced and barrels of flour consumed, with wages, rents, interest rates and commodity prices, with industrial accidents and days lost through unemployment, with human acts, emotions and judgments. Perhaps the widest single category is that of prices, but this falls far short of including all the

[1] *Human Nature and Conduct*, 240–1.

[2] *The Influence of Darwinism on Philosophy and Other Essays*, 72. Henry L. Moore, in "The Statistical Complement of Pure Economics" (*Quart. Jour. Econ.*, xxiii, 16) has quoted part of this passage, and has called attention to the kinship between the pragmatic and the statistical view.

data with which the economist deals. For our present purpose one salient fact alone needs to be emphasized. Whether we are concerned with births or deaths, with unemployed men or with stock prices, with interest rates or human welfare, our primary interest is not in the individual event. There are many reasons why this is so. Complete knowledge of all the events of a given type is absolutely impossible. All the factors affecting the price set in a given sale of wheat cannot be known to us, nor is it conceivable that we should have direct knowledge of all the individual transactions in wheat during a given day, month or year. Moreover, for the purpose of the economist, the individual event is not significant. In a world marked by absolute sameness such knowledge would be important, but such is not the case in the world of economic events. No price bargain, for example, is identical with any other, in all respects. The economist must, perforce, deal with groups, and must ignore the unique event. All the phenomena with which economics deals are complex, incapable of analysis in terms of individual events. Reverting to Maxwell's classification, economic knowledge is statistical, not historical knowledge. It is knowledge of aggregates and groups in terms of averages, and the conclusions of economic reasoning apply only to aggregates of events or things.

The fact of variation, which is an essential element in the statistical view, is of particular importance in the economic field. The mechanical view may be applied to the inorganic world with more accuracy and with fewer qualifications than to the social and economic world, because variation, while it exists in the former field, is less pronounced than in the organic and social realms. Inorganic reality approaches more closely the conceptual limit of absolute sameness than do the facts of social life. Accordingly, natural laws as applied to the physical world have been less hedged about by qualifications than have the generalizations of economics. Economists, in their manipulation of prices, interest rates, profits, and standards of living are handling material characterized by a high degree of variation. The application of the mechanical method, which may involve but small errors in the physical sciences, results in wide discrepancies in the economic sphere between laws of the rigid mechanical type and the facts of economic life. This condition tends to bring about that emasculation of generalizations by a continual process of hedging and qualification which has been characteristic of economics.

The existence of variation makes certainty less attainable in economics than in the physical sciences. Our knowledge relates to averages, and when we seek to go beyond the average to the unique

event we pass into a realm of uncertainty. Because of this wider variation, knowledge in the realm of economics is "mingled with doubt" to a greater degree than in the fields where things and events approach a condition of sameness. As we move away from the conceptual limit of sameness, probability and approximation must play a larger part in our reasoning.

It follows necessarily from this view of the nature of our knowledge of economic events, that generalizations with respect to the data of economics—the laws of economics—are statistical and not mechanical laws. The relations between the events which constitute the raw materials of economics are not constant and immutable. They are relations of partial dependence, of contingency; they are relations in which the element of probability bulks large.

This is quite far removed from that view which was implicit in classical doctrines, and which has been stated by more than one writer of that school. "Alike in the case of the physical and of the economic world," writes Cairnes, "the facts we find existing are the results of causes between which and them the connection is constant and invariable. It is, then, the constant relations exhibited in economic phenomena that we have in view when we speak of the laws of the 'phenomena of wealth,' and in the exposition of these laws consists the science of Political Economy."[1] In this Cairnes reflects the general attitude of his time toward economic generalizations. Political economy was conceived to be a universal science "founded on invariable laws of nature." Governed by this conception, the elder economists gave themselves to the pursuit of general laws of universal validity. They viewed the economic system as they viewed the physical world, seeing both economic and physical phenomena as manifestations of the reign of law. The task of the economist was the discerning and the expounding of these laws. Such an absolutist and animistic conception of law did not conduce to the increase of useful economic knowledge nor to the forging of effective instruments for the control of economic phenomena.

This mechanical view has been generally discarded by modern economists. Most workers in this field have recognized the true nature of economic laws, viewing them as statements of tendencies and average relationships; although, because the approach has not usually been quantitative, the statistical implications of this fact have not generally been realized. Even in an earlier day, the failure of economic laws to work out uniformly and consistently was recognized, but the

[1] J. E. Cairnes, *Character and Logical Method of Political Economy*, 19–20.

subterfuge of *caeteris paribus* was used to take up the slack—a means of evasion rather widely resorted to in traditional economics. In arguing, therefore, that the laws of economics are statements of average relationships, not of uniform and unvarying rules, no new truth is enunciated. Alfred Marshall long since called economic laws "statements of economic tendencies," and this view prevails among economists today. But a fuller recognition and acknowledgment of the implications of this view of the nature of law, both as regards the body of economic theory and the methods of economic research, would serve to advance economic knowledge and to facilitate the effective utilization of that knowledge.

Economists, in accepting Marshall's definition of economic laws as statements of "tendencies," are accepting the statistical view of nature, in the economic sphere. In Royce's language, ". . . the term *tendency* is, in every exact usage which you can give it, an essentially statistical term." But the acceptance of the statistical view has been in most cases unconscious and unavowed. Mechanistic preconceptions, as to the nature of economic data and the character of economic laws, survive to confuse thought and to hamper research. An archaic view of cause and effect run through much of our thinking on economic subjects, even though, in the formulation of definitions, a strict causal relationship has been disavowed.[1]

The failure consciously to acknowledge the statistical nature of many of the central problems of economics tends to take the edge from the tools of economic research. When economists speak of "tendencies," and qualify their statements by "other things being equal" they are dealing fundamentally with statistical factors. Failing to employ appropriate instruments, their statements tend to be loose and ambiguous, their conclusions to lack precision and their "laws" to lack authority. Methods of research and methods of stating and applying conclusions in economics should be adapted to the data being handled. These data are masses of events related not in terms of certainty but of contingency; our knowledge of these

[1] The attitude of W. Stanley Jevons, as expressed in the following passage, is in harmony with the statistical view as applied to economics:

". . . it seems to be impossible to discover more than an approximate law (of human mortality). It may perhaps be urged that in such subjects no single invariable law can be expected. . . . The results observed may in fact be aggregates of an immense number of separate results, each governed by its own separate laws, so that the subjects may be complicated beyond the possibility of complete resolution by empirical methods. This is certainly true of the mathematical functions which must some time be introduced into the science of political economy." *Principles of Science,* 500–1.

events is knowledge in terms of aggregates and averages. Methods appropriate to these conditions must be employed.

No one method may be put forward as constituting the royal road to economic knowledge, and it is far from the purpose of the present paper to present any such claim. All methods must take account of the underlying conditions, however, and if the view here presented be correct, these underlying conditions are statistical in character. A recognition of this fact is at all times necessary; it is imperative when methods involving measurement are employed in economic study.

There is, I think, general agreement among modern economists as to the necessity of measurement if the science of economics is to have a valid claim to recognition. Alfred Marshall's great work centers about the statement "The *raison d'être* of economics as a separate science is that it deals chiefly with that part of man's action which is most under control of measurable motives. . . ." Even the strongest advocate of a deductive science of economics would admit the necessity of employing quantitative methods for testing and verifying his conclusions. Granted the necessity of measuring, questions arise as to *how* we are to measure, as to what tools are appropriate to the data we are handling. If we accept the statistical view of nature, insofar as affairs economic are concerned, we must perforce employ the tools of statistics, and base our reasoning upon the fundamental conceptions of averages, approximation and probability. When dealing with mass phenomena the quantitative method means the statistical method, and our results have the degree of authority given by that method and the limitations inherent in that method. For an understanding of these limitations the distinction between *statistical description* and *statistical induction* is of fundamental importance.

Given a body of material, as a number of commodity prices, wage figures, interest rates, or individual incomes, the statistical method affords a means of describing concisely the characteristics of the group. Since there is a high degree of individual variation we are precluded from using the historical method. The intensive study of an individual case will not give us the essential characteristics of the group. By a process of averaging the essence of the aggregate may be distilled into a single typical figure representing the central tendency or the most common value. The degree of "scatter" or dispersion about this central value may again be described in summary fashion by a single figure, a measure of variation. The characteristics of the group as a whole with respect to symmetrical arrangement may be described by a third figure. Other distinctive

group features are capable of statistical description in the same way. The three or four resulting values have replaced the hundreds or thousands of individual figures representing the individual members of the group. The individual case has disappeared, has been submerged in the group. The measures secured relate to the group as an entity. Knowledge of the individual cases has been sacrificed deliberately, to the end that our knowledge of the group may be increased.

Again, the problem may be that of describing the relationship between two variable factors. We may be seeking to describe, in summary fashion, the development of wheat production during the last fifty years, the relation between gold production and prices, or between capital expenditures on land and the yield per acre. Here we enter a field in which the economist is particularly interested. Most of his problems concern such relations—between prices and rents, between wages and productivity, between demand and price, between supply and price, between population and land values. How may we measure in quantitative terms the relationship between two variables of this type?

The problem is precisely the same as that facing the physical scientist when he seeks to establish empirically a "law" which describes the relationship between variables in his field. An example from a physical science and another drawn from a field in which the economist is directly interested will illustrate the method and will serve to exemplify the generalizations characteristic of these two types of data.

In Figure 1 are plotted fourteen points, representing corresponding values of the terminal voltage and the current in a 118-volt tungsten filament incandescent lamp.[1] The problem is that of securing a statement in quantitative form of the functional relationship between these two variables, together with a measure of the degree to which this relationship actually holds in experience. This latter measure will lie somewhere between zero, which indicates complete independence, and unity, which indicates a perfect cause and effect connection. The curve fitted to the fourteen points by appropriate methods represents an empirical approximation to the law which describes the relationship between these factors. The measure of correlation in this case has a value of .99987, which approaches unity so closely as to indicate an almost perfect causal connection. We stand here virtually at the conceptual limit of complete certainty and

1 This example is taken from Steinmetz, *Engineering Mathematics*, 235–8.

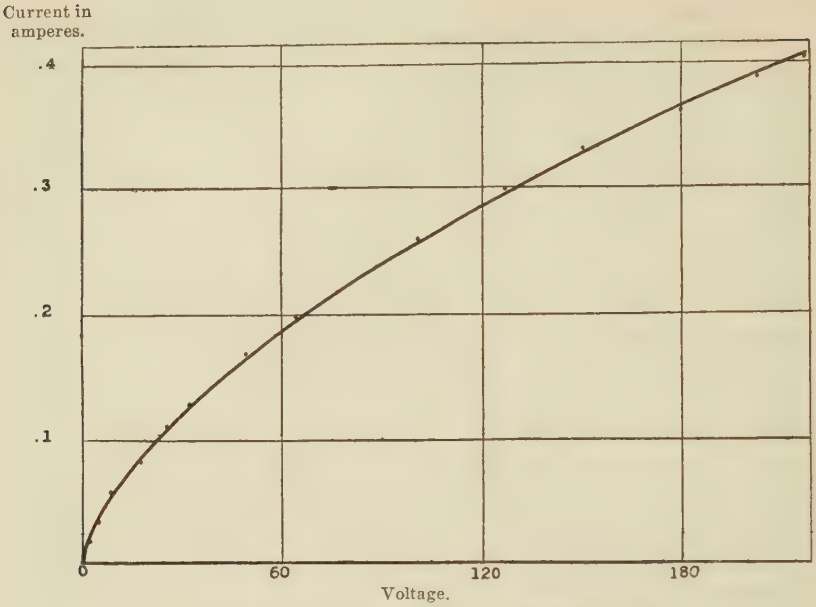

FIG. 1. AN ILLUSTRATION OF A PHYSICAL LAW.

Graph of an equation describing the relationship between terminal voltage and current in tungsten lamp filament.

(The points plotted represent observations of corresponding values of terminal voltage and current in a 118-volt tungsten lamp. The equation to the curve fitted to these points is $y=0.01624x^{0.6}$)

(From Steinmetz)

perfect dependence. This is the type of relationship which the laws of the most accurate of the physical sciences describe, a relation which in many cases accords so closely with the mechanistic view that the application of the mechanical method involves no appreciable error.

The points plotted in Figure 2 represent the corresponding values of alfalfa yield and depth of irrigation in forty-four different experiments.[1] The problem is identical with that faced in the preceding case, the objects being the expression of the functional relationship in the form of an equation, and the measurement of the degree of deviation from the average relationship so described. The curve fitted to the plotted points represents the functional relationship. The equation is given below the figure. The second measure required, that of degree of correlation, has in this case a value of .80, which indicates

[1] The data were obtained from "The Economical Irrigation of Alfalfa in the Sacramento Valley"; *Bull. No.* 280 *of the University of California Agricultural Experiment Station*, May, 1917.

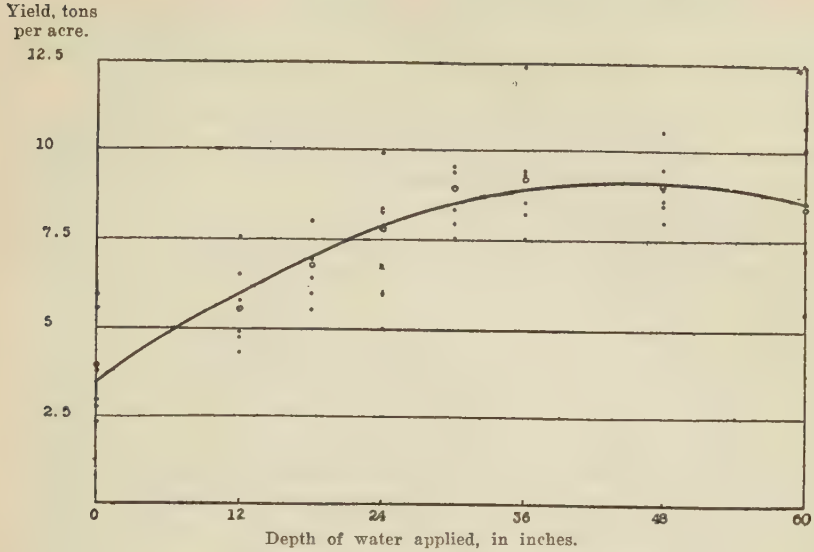

FIG. 2. AN ILLUSTRATION OF AN ECONOMIC LAW.

Graph of an equation describing the relationship between alfalfa yield and depth of irrigation water.

(The points plotted represent observations of alfalfa yield in tons per acre and depth of irrigation water in inches. The average in each class is distinguished from the other points. The equation to the curve fitted to these points is $y=3.55+.252x-.002816x^2$)

a close connection, but not one of complete dependence, between alfalfa yield and depth of irrigation.

This latter is the type of relationship which economic laws approximate, and this is the general method by which such laws may be given precision and utility. An additional measure of the dispersion about the curve may be computed, making even more precise the description of relationship which this method affords. Here is no vague generalization, but an exact statement of relationship. This is the type of information which we may secure in a sphere in which statistical knowledge, in terms of averages, approximation and probabilities, is alone possible.

But this knowledge is restricted in scope. In describing a single group, averages are fully representative only when they relate to the cases included in the given sample. So, in describing relationships, our "laws" hold with validity, within the limits determined in the given situation, only when confined to the cases included in the sample studied. With respect to that group we may apply the results with absolute confidence. This is *statistical description;* results are applied only to objects actually measured or to events actually observed.

The economist cannot be content with this. He seeks generalizations which will apply to a wider group, to events not observed, to cases not included in his sample. He seeks, that is, to employ the ordinary methods of induction, basing the logical process upon materials of a particular kind—statistical data. This process of *statistical induction* gives rise to problems quite distinct from those encountered when mere description is attempted. Since most economic studies which are quantitative in character involve such a process of generalization, some of the assumptions and limitations of statistical induction may be set forth.

4. THE NATURE OF STATISTICAL INDUCTION

The time-worn controversy over the relative merits of induction and deduction in scientific research has perhaps not been settled, but it seems to have been shelved, so far as current discussion is concerned. The problem remains, but the controversy does not burn so brightly as it did a generation or two ago. Having reached the practical conclusion that the two methods must go hand in hand, the scientist has ignored such smoulderings of the controversy as have survived. There undoubtedly has been a greater emphasis on the quantitative aspect of research and a greater readiness to submit theories to the arbitrament of facts than at certain periods in the past, but this has not meant an out and out acceptance of the Baconian all-case method. In the field of economics today, while pure economists and empiricists may follow their separate bents, there is certainly no such sharp difference of opinion as to method as that which separated Hume from Bacon, or Bagehot from Cohn. Abstraction and empiricism have reached something approximating a working agreement in economics, if they have not in philosophy.

But while we may recognize that pure deduction and pure induction are alike unworkable as scientific methods—that, on the one hand, there is an inductive residue in even the most abstract piece of scientific reasoning, and, on the other, that the foundation of a universal generalization upon the mere multiplication of instances is logically quite invalid—there still remains a question as to the relative importance, in any given field, of deduction from general principles as opposed to the inductive methods of enumeration and analogy. The following conclusion is suggested.

The mechanical concepts of direct causal relationship and of invariant law do not accord strictly with the facts in any scientific field. Infinite knowledge and perfect certainty being impossible, some elements of ignorance and doubt must always be present in

scientific reasoning and prediction. But in certain of the physical sciences these elements are reduced to a minimum, and the concept of mechanism comes close to actual realization. In such fields, where the notions of perfect causality, absolute sameness and certainty most closely approximate the truth, the amount of inductive evidence needed to support a train of deductive reasoning will be small. Such inductive evidence will always be required, but the amount of such evidence necessary as a foundation or a verification of an argument will vary directly with the number of causes in operation and the degree of variation in nature.

It follows from this that as scientific method invades fields in which large errors are involved in applying the mechanistic concept, in which a multiplicity of causes operate and in which there is a high degree of variation in the data, a much larger body of inductive evidence is needed.[1] The premises will be tinctured with a larger element of doubt, the initial degree of probability will be less, and therefore more facts and more varied facts will be needed to establish a reasonable degree of probability for the conclusions. Induction must play a commanding rôle in investigations in those fields in which the elements of approximation and probability bulk large. Where we must phrase our laws in terms of "tendencies," where "other things must be equal," where laws must be qualified because the effects of single causes cannot be isolated, and where the operation of many factors in a given case must be recognized—in other words, where the statistical view of nature applies in its fulness—induction can never be merely a halting companion to deduction but must play a dominant part in scientific investigations.

Economics constitutes such a field. A multiplicity of causes operate, variation is pronounced, some degree of uncertainty enters every argument, and an element of probability attaches to every conclusion. By purely *a priori* reasoning, moreover, a measure can rarely, if ever, be given to this element of probability. Such accuracy as may be given to the conclusions of economic reasoning must come from the test of facts. In such a field, where probability and uncertainty are ever present, the trains of deduction must rest upon solid inductive foundations. The tendency of some writers of the past to

1 The relation between the inductive process and the multiplicity of causes has been noted by Mill, as well as by later logicians. "The plurality of causes," Mill writes, "is the only reason why mere number of instances is of any importance in inductive inquiry." *System of Logic*, Book IV, Chap. X, 2. Quoted by Keynes, *loc. cit.*, 269.

rear their structures of theory upon less solid foundations called from Cliffe Leslie the just criticism that economists, dwelling in the "region of assumption, conjecture and provisional generalization" too often "jumped to the laws without heed to the phenomena."

If induction is to play such an important rôle in economic research, economists should employ this tool with a full knowledge of its possibilities and its limitations. The logical basis and the limitations of non-quantitative induction have perhaps been more fully set forth and are understood more generally than is true in the case of quantitative induction employing the methods of statistics. With the increased use of measurement in economics most inductive processes in this field are based upon statistical results. These results, in the form of averages, frequency ratios, coefficients of correlation or empirical equations, are usually taken to apply to objects or events not included in the sample on which they are based, and this extension corresponds to the usual inductive process of generalization from particulars. The logical justification for such an extension and the conditions upon which a generalization is valid have been discussed by logicians and students of probability, but these questions are generally ignored in actual statistical study.

As regards economics, it is perhaps not too much to say that we are here considering the central problem of economic research. If there be validity to the arguments set forth above as to the essentially statistical character of the data of economics and the laws of economics, and if inductive methods must play a large part in the derivation and verification of the laws of economics, no problem is more important than that of the logical soundness of induction based upon statistical results. Are we justified in generalizing from limited data? Does the fact that the data and the results happen to be in quantitative form make the process any more accurate than it would otherwise be? What validity have empirical laws? Admitting the existence of elements of approximation and probability in all such generalizations, can a method be developed for measuring the precise degree of probability in a given case? Can the logic of probabilities eliminate or lessen the uncertainty which attaches to all events in the world about us—in none, perhaps, to a greater degree than in the economic realm? These are questions of profound importance. Perhaps they cannot all be answered, but at least they cannot be ignored.

The conclusions of all inductive arguments must be expressed in terms of probability. They can never attain to a condition of certainty. This fact was recognized by Laplace and Jevons; more

recently C. D. Broad [1] and J. M. Keynes [2] have given rigorous demonstrations of the necessity of stating inductive conclusions in these terms. Because of its bearing upon the central problem of statistical induction the argument may be briefly summarized.

Keynes divides all generalizations based upon empirical evidence into two classes, those involving *universal induction,* and those in the form of *inductive correlations.* The former affirm invariable relations, though any degree of probability may attach to the conclusions. The latter process leads up to generalizations of the type described in earlier sections of this paper, to statistical laws, laws of "probable connection." For the present we are concerned with universal induction.

Such an induction, it has been established, involves a formal fallacy (the fallacy of drawing a universal conclusion from a particular premise) unless the conclusion be couched in terms of probability. No universal generalization based upon a study of instances, no matter how numerous, can be known to be a certain truth. So much needs no demonstration. But more than this acknowledgment is necessary to render an induction valid. If such a generalization is to be true with any finite degree of probability, some assumption must be made about the nature of the universe from which the facts were drawn and to which the conclusion applies. The argument from particular facts to a general law must proceed from some premise about nature, in addition to that premise which takes account of the instances studied.

The nature of this "missing premise" about nature may be made clear by assuming the universe from which the instances were taken to be characterized by utter chaos, with an infinite multiplicity of causes and an infinite variety of phenomena, possessing nothing of uniformity, stability or order. General laws might be assumed, after a study of cases drawn from such a universe, but no finite probability would attach to these generalizations. In order that there should be a reasonable degree of probability in favor of the truth of an inductive conclusion it is necessary that we make some assumption about the orderliness of nature and the degree of variety to be expected in the universe to which the conclusion applies.

This missing premise upon which all inductions rest has been

[1] "On the Relation Between Induction and Probability" *Mind,* N. S., xxvii, 1918, and xxix, 1920.

[2] *A Treatise on Probability,* 1921.

[3] *Loc. cit.,* 220.

vaguely described as the uniformity of nature. In different forms it enters into the reasoning of students in many fields, for some such assumption is a necessary bed-rock of all scientific thinking. Josiah Royce, following Charles Peirce, finds it in "the more or less systematic tendency towards a mutual assimilation of the fortunes, the characters, or the mutual relations of the members of (an) . . . aggregate," and in this urge towards mutual assimilation he finds not only "nature's principal tendency" but, as well, the expression of an "unconscious teleology" in nature.[1] Karl Pearson sees it in "the routine of experience" traced back to a "routine of perception" which is an essential condition of knowledge.[2] Keynes finds the justification for the inductive process in "the limitation to the amount of independent variety" in nature. Defining a finite system, as distinguished from a collection of heterogeneous facts, as one in which "the number of premises, or . . . the amount of independent variety (is) . . . less than the number of its members," he contends that probable knowledge of facts or propositions belonging to a finite system can be obtained by means of an inductive argument. We require *a priori* a finite probability in favor of an inductive conclusion, according to Keynes, the methods of empirical proof being used merely to strengthen such a probability. This initial probability is based on the assumption of a limited amount of independent variety in nature.[3]

C. D. Broad finds the missing premise about nature in a theory of "natural kinds," based on the assumption "that nature consists of a comparatively few kinds of permanent substances, that their changes are all subject to laws, and that the variety of nature is due to varying combinations of the few elementary substances." In other words, "experience has suggested a simple ground plan

[1] Royce, *loc. cit.*, 565.

[2] *The Grammar of Science*, chaps. III and IV.

[3] Keynes, *loc. cit.*, 251–3.

One point which Keynes emphasizes is worthy of note at this stage of the argument. A universal induction, leading to a generalization to which there are no exceptions, is justified only on the assumption "that a finite degree of probability always exists that there is not, in any given case, a plurality of causes." In "dealing with inductive correlation, where we do not claim universality for our conclusions, it would be sufficient for us to assume that the number of distinct generators, to which a given property can be due, is always finite." The fact that the former assumption is hardly plausible "strongly suggests," writes Keynes, "that our conclusions should be in the form of inductive correlations, rather than of universal generalizations." This furnishes an interesting logical confirmation of the statistical view of law, as presented above.

of the material world to us, and . . . it is reasonable to suppose that the plan extends beyond what we have actually experienced." When we feel that we have an understanding of the ground plan, the fundamental structure of phenomena in a given field, considerable weight is attached to inductions; otherwise a very slight degree of probability attaches to them. Until such a ground plan is discovered in a given field, says Broad, investigation is almost at a prescientific level.[1]

Granting the validity of some such assumption about nature, universal inductions may possess some finite degree of probability. They will never attain to certainty, nor may the degree of probability be expressed numerically. "The logical position is (a) that those inductions which we regard as highly probable are so relatively to the belief that we really have got hold of the general ground plan of nature in the region of phenomena under investigation; (b) the evidence for this is never of the nature of a 'knock-down' proof and no numerical probability can be assigned to it."[2] If we could assume a definite number of independent influences at work this probability might be measured, but such an assumption cannot usually be made.

With these arguments in mind, the particular problem of statistical induction may be considered. Induction of this type consists, simply, in the application of certain statistical results to objects or events not included in the sample studied, these results corresponding to the generalizations which are the usual objects of the inductive process. Thus an average of earnings of industrial employees is determined by the study of a sample group, and is accepted as applying to the entire group from which the sample was drawn. An index number of wholesale prices, computed from quotations on a limited number of commodities, is taken as representative of all wholesale prices. Or a statistically derived law, such as the equation describing the relationship between alfalfa yield and inches of water used in irrigation, is accepted as of general validity.

This process of generalizing from statistical results is a common one. A sample is studied, the "probable error" of the result determined by methods the logic of which is seldom investigated, and the findings are presented as of general significance, with few, if any, qualifications. This procedure is by no means of unassailable soundness, and cannot be followed without due regard to possible

[1] *Loc. cit.*, xxix, 42–5.
[2] *Ibid.*, 44.

pitfalls. Yet this sort of induction plays, and must play, such an important part in economic research that the economist must give attention to the strength or weakness of the logic behind it.

Quantitative inference of this type differs in no wise from the ordinary process of induction, except in that one of the premises is in quantitative form, and that the conclusion asserts only a probable connection or extends an average value, which may or may not hold in any given case. Both evidence and conclusion deal with only probable and approximate relationships or average values, and in this respect accord more closely with actual experience than do the premises and conclusions of universal inductions.

The problem at issue in the discussion of the validity of this process relates to the reliability of the results, to the stability, when applied beyond the sample, of the averages, ratios or equations computed. The whole practical problem of statistics centers about the stability of such results, and the limits to such stability when the results are generalized in this way.

The factors in the case are practically the same as in the case of universal induction. Since we are generalizing from a limited sample, some degree of probability must attach to the conclusion. To justify such a conclusion, moreover, an assumption about nature, similar to the assumption of uniformity suggested above, must be made. There will be an *a priori* element in this assumption. Finally, since the attempt is usually made to measure the precise degree of probability attaching to such a quantitative conclusion, a principle of probability enters more specifically into such arguments.

The assumption about nature which constitutes an implied premise in all statistical generalizations, and which corresponds to the conception of finite variety, is Quetelet's "stability of large numbers" and Clerk Maxwell's "new kind of regularity, the regularity of averages." The multiplicity of causes and the existence of variation in nature, which make statistical rather than mechanical methods necessary, are accompanied by a limitation of variety and a stability attaching to numbers in mass which bring some order out of the complexities of nature, sufficient order to render scientific method applicable and knowledge possible. That there is such stability is always assumed in generalizing from statistical results, and the assumption introduces an *a priori* element into such inductions.

The degree of probability attaching, in any given case, to this assumption of stability is incapable of precise evaluation, yet it is essential to the process of statistical induction that this stability be tested and, if possible, measured. If the results are to be applicable

beyond the sample, some idea of the limits within which the statistical measure is likely to fluctuate is a practical necessity. If 5 per cent of the men of a certain age, in a given sample, die within a period of twelve months, what are the probable limits within which this ratio will fluctuate when applied to the larger group from which the sample was taken? If 20 per cent of a sample group of wage-earners are unemployed more than 100 days a year, what are the probable limits to the fluctuations of this ratio when applied beyond the sample? The answers to these questions involve the theory of inverse or empirical probabilities. As to the soundness of this theory a question has been raised which Pearson has called the fundamental problem of practical statistics. For the very foundation of statistical induction, insofar as an attempt is made to measure the stability of the conclusions, rests upon the validity of determining probabilities empirically.

When we have *a priori* knowledge of the probability of a given event we are able to assign in advance the probable outcome of a trial or of a number of trials. Thus when a coin or die is tossed all the possible outcomes and their respective probabilities are known in advance. Our knowledge of probabilities is *empirical,* on the other hand, when based upon the results of a number of trials or upon statistical frequencies. It is a probability "into the determination of which actual experience has entered as a dominant factor." The term "inverse probabilities" has also been applied to the latter type, as the probability ratios are derived by reasoning backward from the results to the probabilities. In practically all cases in which the statistical method is applied to the data of economics our knowledge of probabilities is of this empirical character. Whenever a generalization is based upon a statistical study, whether it relate to mortality rates, income distribution, the correlation between variables, or any similar material, it applies to the larger field not with certainty but with a degree of probability, and insofar as this degree of probability is known it is known only empirically.

The issues at stake in the controversy as to the validity of thus computing probabilities from the results of experience may be briefly indicated, without going into the details of the argument. Formulae associated primarily with the names of Bayes and Laplace have been developed for computing from the results obtained from a limited sample the probability of securing similar results in a study of the larger group from which the sample was drawn. More exactly, these methods are employed for determining the probability that the subsequent results will fall within certain stated limits. Such

calculations enable extensions and predictions to be made, not with certainty, but, at least, with the doubt confined within measurable limits. The ability thus to project and extend with a measurable margin of error, thus to judge future probabilities from past experience, is fundamental in practical statistical work, and, it may be argued, is of basic importance in the ordinary conduct of life.[1]

The controversy over this process of deriving numerical probabilities from observed frequencies centers about the question as to whether empirical evidence alone is sufficient. The possibility of determining probabilities in this way has been denied by more than one logician. Among recent writers, J. M. Keynes has argued strongly against the process of determining probabilities from purely empirical evidence, and has questioned the validity of methods frequently employed in statistical investigations. Keynes' criticisms cannot but have a salutary effect on practical statistical work. The emphasis he places upon the logical foundations of statistical method may serve to awaken statisticians to the need of a thorough understanding of the assumptions on which they base their work. But he has gone farther, it would seem, in throwing empiricism overboard and in denying the validity of inverse probabilities than the practical statistician can go.

M. C. Rorty has said that all business and most engineering operations are based fundamentally on probabilities, and it may be added that the probabilities which enter into these operations are derived primarily from experience. The wide-spread activities of life and fire insurance rest upon probabilities which are largely empirical. "The real importance of the theory of probability in regard to mass phenomena consists," says Tschuprow, "in determining the mathematical relations of the various probabilities not in a deductive but in an empirical manner—without an *a priori* exhaustive knowledge of the mutual relations and actions between cause and effect—by means of statistical enumeration of the frequency of the observed event. The conception of a probability finds its justification in the close relation between the mathematical probabilities and the relative frequencies as determined in a purely empirical way."[2] Certainly

[1] "The practical man is always working by comparative probabilities, even if he has not reduced his appreciations to numbers. He would certainly scoff at the idea that a first sample should not influence his judgment of what a second sample or what the bulk would be like. For such an idea would render most actions in life impossible." Karl Pearson, "The Fundamental Problem of Practical Statistics," *Biometrika*, xiii, 3.

[2] Quoted by Arne Fisher, *The Mathematical Theory of Probabilities*, 82.

this is true as regards social and economic problems, in which fields the strict *a priori* method has practically no applications. Karl Pearson, while admitting that an ultimate logical demonstration of the approximate stability of statistical ratios may be impossible, contends that this principle of inverse probabilities "rests on the foundation of common sense and the experience of what follows its disregard." [1]

Yet strict empiricism in the field of probabilities rests upon a rather dubious foundation. Without going as far as Keynes, the existence of an *a priori* element may be recognized as a base upon which empirical methods build. It may be called "common sense," but something apart from the mere objective evidence enters as a rational basis for empirical probabilities. In his *Mathematical Theory of Probabilities* Arne Fisher has clarified the issues in this old problem and, while recognizing the dominant part that empirical probabilities must play in the actual application of statistical methods, has admitted the necessity of a subjective element. Neither a strict dependence upon *a priori* probabilities nor a strict empiricism will serve as a basis for practical investigations. Probabilities may be derived from experience, though the subjective elements of reason and common sense must be ever present. "We do not need to limit our investigations to problems where we are able to determine *a priori* the probability for the happening of an event in a single trial, but limit ourselves to postulate the existence of such an *a priori* probability." [2] By empirical methods an approximation to this postulated *a priori* probability may be secured, and for practical purposes such an approximation is all that is required.

We must, in all this, recognize the validity of Keynes' chief criticism, and grant that some degree of doubt must attach to probabilities based upon empirical evidence, that the statistician's "probable error," when used in an inductive sense, represents a spurious accuracy. Since, such a doubtful measure must be used, in default of better, it is incumbent upon the statistician to recognize the fictitious accuracy of this measure when applied inductively, and to make every possible effort to reduce the degree of doubt by strengthening the evidence, by increasing the amount of relevant knowledge. If he does not do this, if he trusts merely to his mathematical computations, failing to take the precautions which are essential to the validity of any induction, failing to recognize that the weight of

[1] "On the Influence of Past Experience on Future Expectations." *Phil. Mag.*, xiii (6th series), 1907.

[2] Arne Fisher, *loc. cit.*, 114.

statistical evidence alone is inadequate, the foundation of his argument will be of the veriest quicksand.

Granting the empirical justification and the practical necessity of statistical induction, the question arises as to how the doubt which attaches to the conclusions of this type of reasoning may be minimized. The probabilities derived from the application of Bayes' theorem represent the probable limits of error in generalizing from statistical results, on the assumption that certain conditions have been satisfied. The extent to which these conditions have been fulfilled can never be determined precisely, but in order that confidence may attach to statistical inductions every effort must be made to satisfy these conditions and to make as accurate as possible the measure of probability derived from the induction. The methods of thus validating statistical induction are in part familiar in every-day practice, but their importance cannot be over-emphasized, in view of the doubt which must adhere to the conclusions of any induction.

A first and commonly recognized requirement is that methods of random selection should have been employed in choosing the sample studied. With respect to the generalization in question, the members included in the sample should be random members of the larger group. How this may be attained need not concern us here.

A second method of increasing the reliability of the induction involves the testing by every possible means of the stability of the average, frequency ratio, coefficient of correlation, or equation of relationship. It is a virtue of Keynes' book that he has stressed the importance of such statistical tests of stability, as opposed to the mathematical method of computing probabilities from a single sample. Logically, this means verifying the assumption about nature—about the universe of facts from which the sample was drawn—which is variously labelled the uniformity of nature, the stability of large numbers, or the regularity of averages. This stability is always assumed but is seldom verified by comprehensive statistical methods. By breaking up a sample into significant sub-groups, by including new cases classified according to some significant principle, and by testing the stability of the given measure as computed for these minor groups, the soundness of the original assumption may be determined and the whole inductive process validated. Keynes has pointed out that this testing of stability in the results, when the data are thus re-grouped on the basis of definite class-characteristics, corresponds to the process of improving the analogy which is fundamental in any induction. Technical methods of testing this stability

have been developed by Lexis.[1] The necessity of such analysis has been generally recognized, but in the drawing of inductive conclusions from actual statistical results these tests are generally neglected. If the unmeasurable element of doubt which attaches to any induction is to be minimized, there must be present such evidence of stability under varying conditions. Such a test, if successful, proves the essential homogeneity of the sample with respect to the characteristic or association in question, and creates a presumption in favor of the homogeneity of the larger group to which the results are to be applied. A mere increase in the number of cases will not serve the same purpose, and will not strengthen the argument to the same extent.

The inductive process, as based upon statistical results, is thus subject to the same sort of limitations as the general process of induction. Statistical measures are better adapted to generalization, in a world marked by variation, than are the conclusions of universal inductions; they constitute a far more useful scientific tool, but they cannot be used without regard to these limitations. A statistical induction resembles a universal induction in that it can never carry complete confidence unless there be present some *a priori* element, something in addition to the mere statistical evidence. Actually, this is recognized in the formal terms of statistical procedure. The group must be "homogeneous," the members included in the sample must be chosen "at random." The statistical evidence alone will never furnish complete proof that these conditions have been realized; an *a priori* factor must be present to substantiate the statistical evidence. A recognition of the need of such confirmation and of the other limitations to statistical induction will not make the tools of statistics less useful; on the contrary, greater weight will attach to the well-tested and properly qualified conclusions of legitimate induction.[2]

[1] *Cf.* Keynes, *loc. cit.*, Chap. XXXII.

[2] The above discussion has a bearing upon the relation between *rational* equations or laws on the one hand and *empirical* equations or laws on the other, a matter of some importance to the present argument. The former class consists of those mathematical expressions of relationship which may be deduced from known laws, while empirical equations are those having no theoretical justification, no known relation to accepted principles or laws. A sharp distinction is usually drawn between these two types. Little weight is given to empirical laws; rational equations are supposed to differ in some fundamental respect from the empirical type, and to apply in a rigorous and invariant manner. A true conception may perhaps be gained from the preceding discussion. The purely empirical law and the purely *a priori* law, if there be any

5. SUMMARY AND CONCLUSIONS

The foregoing arguments may be briefly summarized.

Nature is so organized and human faculties are so circumscribed that complete knowledge of the historical or descriptive type is impossible. We cannot discriminate or handle scientifically the multitude of unique objects and events which make up the universe of facts in any given field. We must deal with phenomena in the aggregate, sacrificing detailed knowledge of individual things and events for the wider, more useful, though less precise knowledge of averages. Knowledge of single events, moreover, is of little practical use because of variation in nature, because individual phenomena, even of

such, would stand as far apart as the poles. Actually, they shade off into each other by imperceptible degrees. As Edgeworth writes, ". . . formulæ which have not and those which have an *a priori* basis . . . are as opposite as night and day; yet as night insensibly passes into day, so it is impossible to fix the point at which the presumptions of deductive reasoning become effective." ("On the Representation of Statistics by Mathematical Formulae," *Jour. of the Royal Statistical Society,* lxii, 546.) To carry weight there must be some *a priori* element in any empirical law, and this element will be present in varied proportions in scientific generalizations.

As the deductive element increases, greater weight will ordinarily attach to generalizations, provided the empirical test of correspondence with the facts be met. The greater weight ordinarily attaching to the law with a rational or deductive basis does not necessarily arise from a closer agreement with the facts. "As regards the accuracy of representing the observations," says Steinmetz, "no material difference exists between a rational and an empirical equation. An empirical equation frequently represents the observations with great accuracy, while inversely a rational equation usually does not rigidly represent the observations, for the reason that in nature the conditions on which the rational law is based are rarely perfectly fulfilled." (*Engineering Mathematics,* 210.) That a law is rational, therefore, does not mean that it describes an invariant relationship. The stronger logical base, not a closer correspondence with the facts or a closer "fit" in the mathematical sense, accounts for the greater weight attaching to generalizations of this type and for the greater confidence with which curves based upon rational equations are projected.

In actually improving scientific generalizations we do not jump from the empirical to the rational, but pass from first approximations, which may be largely empirical and limited in scope, to more inclusive and perhaps simpler statements with a stronger deductive base, supported by wider knowledge and weightier *a priori* arguments. Our confidence in such generalizations must rest upon both empirical evidence and *a priori* reasoning. The conditions which determine our judgment of a scientific theory are summarized by Cournot in these words: "Le jugement que la raison porte sur la valeur intrinsèque de cette théorie est un jugement probable, dont la probabilité tient d'une part à la simplicité de la formule théorique, d'autre part au nombre des faits ou des groupes de faits qu'elle relié." (Quoted by Henry L. Moore, *Laws of Wages,* 10.)

the same type, are not identical. This is particularly true in the realm of economics. Here not only is it impossible to secure comprehensive and exhaustive knowledge of individual events, but such events have significance for us only when considered in the mass. We would have no use for knowledge of the multitude of individual events, even were such knowledge to be had.

From this view, the generalizations which we term laws are not to be accepted as statements of invariant mechanical relationships, but as statements of tendencies, of average relations. In fields where the degree of variation is slight, the conception of perfect mechanical relationship—cause and effect linked by invariant ties—approximates the truth, but material error is involved in the strict application of this mechanical concept in fields characterized by wide variation and a multiplicity of causes. This is the situation in the field of economics. Hence even the most exact of the laws of economics must be interpreted in this statistical sense.

These facts bear directly upon the question of method in the study of economic problems. While it is recognized that induction and deduction must constantly supplement each other, it is suggested that the relative importance of these methods varies in different scientific fields. The methods of deduction may be expected to be most fruitful in fields characterized by slight variation, in which there is a close approach to the conditions of sameness and invariant relationship which are essential to the validity of the mechanical view. While the test of facts must be met here, it will be satisfied by a relatively small amount of inductive evidence. In fields marked by wider variation, where the generalizations must admit of many exceptions, the fruitfulness of deductive reasoning is more limited, and the direct study of facts, assembled and classified, must play a dominant part in scientific investigation. Induction increases in importance as the causes in operation increase in number, as variation becomes more pronounced, and as the relations between phenomena depart farther from the simple cause and effect connection which is assumed in the application of mechanical methods. Since a multiplicity of causes and wide variation within classes of phenomena are characteristic of the data of economics, induction must ever be one of the most important tools employed by the economist.

To a greater extent than ever before economists are today seeking to secure the accuracy and precision which quantitative methods ensure. Induction in a quantitative science of economics involves the handling of numerical facts in the mass; its methods must be sta-

tistical. Statistical induction is, in all essential respects, similar to induction of the more general type, except that its results are quantitative in form, and that its generalizations are not necessarily universal. Its conclusions deal with frequencies, averages, or with relationships which hold on the average, or in a certain percentage of cases. Exceptions and limitations are recognized. That is, the generalizations which are the objects of statistical induction are of the type described in discussing the meaning of law from the statistical view. They represent the only valid type of generalization, if this view of nature be correct.

Since statistical generalizations hold only with a degree of probability, it is essential that in any given case we determine the reliability of the result by measuring this degree of probability. This necessitates the determination of probabilities empirically. A measure of probability may be secured in this way, but it is a measure to which absolute certainty can never attach. From sheer force of necessity we must employ these empirical methods which furnish approximations to the true probabilities involved; they constitute "the only logic for the practical man." But their approximate character should always be recognized, and every effort should be made to reduce the margin of error.

This margin of error may be reduced in two general ways. The first is based upon the assumption that there is some measure of initial probability in favor of an inductive conclusion. The greater this *a priori* element the more certain we may be that our conclusion has validity, and that the results secured by the method of inverse probabilities are a true measure of the reliability of this conclusion. If the *a priori* element be entirely absent, and we trust to sheer empiricism, a strong and unmeasurable degree of doubt must attach to the generalization.

The second method of increasing the reliability of inductive findings requires the testing of the stability of the statistical ratio or measure of relationship under varied conditions. This purely statistical method of examining the stability of a given result, when the data are re-grouped in significant ways, may serve to increase materially the strength of a statistical argument. This process is more fruitful than that of merely increasing the number of cases. By these two methods the degree of doubt which enters into every inductive argument may be reduced to a minimum, and the probability of error involved in any extension of the results reduced until it approximates the measure derived by ordinary mathematical methods.

The development of the statistical method has placed in the hands

of the inductive economist a trenchant tool, and has given his results precision and practical utility which in the past they have lacked. Yet a loose employment of this tool constitutes a dangerous pitfall. Because the statistical method presents quantitative results, in the form of mathematical equations and coefficients, an impression of absolute accuracy which is frequently thoroughly misleading is conveyed. It is, therefore, highly essential that the logical limitations of this method be clearly understood, and that all necessary precautions be observed in using statistical results as foundations of inductive arguments.

There are dangers in the employment of induction to which the worker in the statistical field is particularly exposed. There is danger that immersion in technique will blind him to unsound assumptions and inherent limitations. And there is the abiding danger of over-emphasis on mere fact gathering, of attempting to find truth through the weight of a multitude of facts alone. Facts must be illuminated by the play of speculative reasoning, by "the light of the idea," before they can have significance, before valid generalizations can be secured. That there is a logical reason for the sterility of unilluminated facts has been emphasized in stressing the need of an initial *a priori* probability in favor of a given conclusion. This initial probability is perhaps strongest when, in Broad's phrase, we feel that we have got hold of the fundamental ground plan of nature in a given field. We "flounder about in the dark till some man of genius sees what are the really fundamental factors and the really fundamental structure of the region of phenomena under investigation." When we have secured this ground plan, the "limping methods of empiricism" become fruitful, and inductions carry conviction.

Yet here we are not harking back to pure deduction as the basic method of science. The understanding of the ground plan which explains and illuminates a wilderness of miscellaneous facts is secured ordinarily only by a study of the facts. It does not leap full-formed out of chaos, but grows in the mind of the man of genius, or in the consciousness of the race, by successive approximations. Facts must furnish the fuel for the light of the idea. Darwin started to assemble facts in true Baconian fashion, he says, and arrived only after years of study and classification at the great generalization which gave meaning to his multitudinous data.

It may be that it is only given to the man of genius to arrive at the profound generalizations which shape the course of scientific study for centuries. But such generalizations are, in fact, the

products of the labor of thousands of workers who have derived the limited conclusions, the tentative generalizations, the empirical formulae which suggest the all-inclusive generalization that may finally top the structure. The aim of that economic research which would be most fruitful in a practical and immediate way must be the limited generalizations which relate to specific groups and specific conditions. In the derivation of such "laws" quantitative induction based upon statistical results must play a leading part.

That the conclusions obtained by statistical methods relate, in general, only to specific cases, and can be generalized only with extreme precaution and careful qualification, is perhaps not altogether unfortunate. Economists who seek all-embracing laws are not unlike philosophers in search of the absolute. Practical and immediate problems are too often neglected in the chase of a rainbow in the shape of a generalization of universal validity. Better immediate knowledge which will help to remedy specific maladjustments than general laws to which there are so many exceptions that they fit nothing. The practical problems facing economists today will be more readily solved and human welfare will be more effectively furthered by quantitative study of specific conditions than by the attempt to apply vague generalizations of doubtful validity. In economics, as in philosophy, "Interest . . . shifts from an ultimate goal of good to the direct increments of justice and happiness that intelligent administration of existent conditions may beget and that present carelessness or stupidity will destroy or forego."[1]

[1] John Dewey, *The Influence of Darwinism on Philosophy, and Other Essays*, 11.

THE SOCIALIZING OF THEORETICAL ECONOMICS

by

JOHN MAURICE CLARK

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THE SOCIALIZING OF THEORETICAL ECONOMICS[1]

I

INTRODUCTION

1. DESCRIPTION VS. EVALUATION

Economics inevitably involves two things: a description of the way economic forces work, and a study of the economic efficiency—or inefficiency—which results. These two have probably never been wholly separated, for various reasons which will appear as the argument proceeds, and it is a debatable question how far it is possible or desirable to attempt to separate them. This question will ultimately be answered, not by *a priori* argument, but by the test of doing—by testing different theoretical methods in terms of their results. Hence there is no need to settle it here and now, and we may go on to examine the theory of economic efficiency.

Is there any such thing as an ideal or standard of economic efficiency, apart from our ultimate ideals of what is good? Can the theory of economic efficiency stop short of the whole problem of ideals of good conduct and welfare; in short, of morals and ethics? Certain limitations have been tried and discarded. First was the conception of the production of material wealth, excluding intangible services. This has given way, for better or for worse, to the broader conception of the production of "utilities" at the cost of "disutilities," so that economic efficiency has become, at bottom, a psychological conception. It is a matter now of human values, and their organization.

But this, of course, is the whole problem of the modern pragmatic ethics. Can the field be divided, so as to mark off one part as the realm of economics? A division can be made, but *it cannot be done without introducing a bias.* The economic standard of judgment

[1] This essay contains some material originally embodied in two papers read before the American Economic Association; "Economic Theory in an Era of Social Readjustment," *Amer. Econ. Rev.* ix, Supp., 280, Mar., 1919 and "Soundings in Non-Euclidean Economics," *Amer. Econ. Rev.* xi, Supp., 132–47, Mar., 1921. The material is here worked over, with the kind permission of the editors of the *Amer. Econ. Rev.*

will become a standard which, from the broader social point of view, is limited or warped, either by excluding certain values (for instance, those on which the market sets no value which their creator can collect) or by accepting certain partial or imperfect judgments of value (for instance, the judgment of the laborer as to the fatigues and other sacrifices of production). This raises questions which, again, will only be answered by the test of doing something about them and seeing how it works, but it is evident at the start that so far as economics is inevitably a theory of efficiency, a biassed theory is inevitably a lame and halting instrument.

2. SCIENTIFIC STANDARDS

Standards of scientific procedure may be divided into different grades, which may be roughly designated as strategy and tactics. Strategy is concerned with the choosing of problems and deciding what ranges of evidence to admit. Tactics is concerned with the use of the evidence in attacking the problems chosen. Tactics should clearly be governed by strategy rather than the reverse. The evidence should be handled with the utmost possible scientific accuracy, but the choice of the problem should be governed by the need for light rather than by the amenability of the materials to workmanlike manipulation. If a white light is needed, the availability of petroleum does not justify the use of oil lamps.

But the effect of the scientific "instinct of workmanship" is persistently in the other direction, choosing problems for whose solution there are available materials which will satisfy canons of accuracy and demonstrability. This has its value as a deliberate and methodical approach toward the citadel of knowledge, but in the social sciences humanity demands that we arrive at something, even if it be not ultimate truth. It wants results of some sort, for the help of the generation now upon the earth, on questions which cannot be conquered by such siege-tactics. Moreover, humanity will derive answers to its practical problems from the work of the economists, whether the work of the economists is intended for that purpose or not.

What if economics as a theory of efficiency opens up problems requiring evidence not amenable to academic canons of accurate and absolute demonstration? What does scientific procedure demand? Scientific tactics says: "Limit the study to evidence about which absolute and accurate statements can be made." But scientific strategy says: "It is unscientific to exclude any evidence relevant to the problem in hand." *This comprehensiveness is scientific,* even

if it involves some sacrifice of other qualities for which science likes to strive.

The intellectual "instinct of workmanship" has resulted in the development of techniques, with characteristic limitations. First came the "deductive" technique, characteristically limited to studying the results of rationalized human nature working under artificially simplified conditions. The limitations of this method have been sufficiently exposed by modern critics—overexposed perhaps. Deductive study is discredited as belonging to the pre-scientific era and induction is set up as the only scientific procedure, with the result that economics frequently seems to be doing its best to become a Description of Economic Behavior and nothing else. And yet even a judgment of cause and effect requires something more than this: it commonly requires insight as to *what might have been,* had conditions been different.

So far as definiteness and accuracy is concerned, induction leaves a vast deal to be desired; its greatest triumph is the unearthing of a prevailing tendency, admitting of many exceptions. In social data, a coefficient of correlation of 1 is virtually unknown. Induction does, however, rest upon observable evidence, and its propositions can be supported or overthrown by observing how facts behave. Moreover, it gives us facts to deal with, and the human mind is quite irrepressible in dealing with facts. Its formal methods are not adequate to give proven results when dealing with difficult material. Yet it is probably impossible to invent a system of logic so tautologically sterile, or a behaviorism so aridly descriptive, as wholly to prevent the human mind from getting at the inner significance of facts. It has ways of dealing with them which it cannot explain satisfactorily, but which serve to extract meaning from data, if only the data can be had.

And so we come back to the proposition that the core of scientific method lies, not in induction nor in deduction, but in taking account of all relevant facts and excluding none.

3. THE NEW PLACE OF THEORY

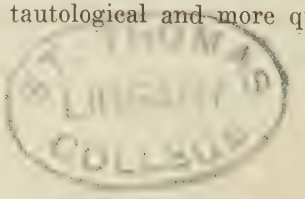
This principle of comprehensiveness, however, places an impossible burden upon that section of economic study which is known as "economic theory." The growth of inductive economic study is enormous; general works cannot cover it or even give an adequate idea of its content. Moreover, the general work is fallen from its one-time place of dignity. When deductive methods prevailed, the general work was the source of truth and fountain-head of economic law, and

special studies were subordinate exercises in "applied economics." With the supremacy of inductive methods the special studies assume the position of scientific authority and the author of the general treatise ought, properly, to make his pilgrimage to all the shrines and master all the special fields before presuming to set pen to paper, preferably verifying all the original data used in all these fields. As this is obviously out of the question, something else must happen.

There is need, great need, for a common discipline which shall animate these special studies, coördinate them and interpret them to each other, and to the intelligent reading public as well. And there are at least four distinguishable services which such a discipline can render. It can furnish a common background of ideas of scientific procedure including both the tactics and the strategy of scientific method: both accuracy of process and comprehensiveness of data. It can furnish tools of thought in the shape of hypotheses, grounded in experience, and available as guides to further study and bases for verification. It can summarize the most important results of inductive study and generalize them; always keeping clear the difference between completely verified results and tentative generalizations which are subject to further verification. And finally, it can present an orienting interpretation of economic life which will have an important pragmatic bearing, governing the kind of opinion and action on practical issues which is likely to grow out of it. This pragmatic bearing is something economic theory cannot escape if it would; it attaches not merely to theories of efficiency but to purely descriptive statements. It is one of the most important qualities of any economic theory, and it is the chief concern of this present paper.

4. INDUCTION AND HYPOTHESIS

So far as economic theories are to serve as hypotheses for inductive studies to verify, it follows that these hypotheses must be such as the workers in the field will use. They must be verifiable; which means that they must call for a definite kind of behavior under given conditions, so that if that kind of behavior is found, they will be proved; and if not, they will be disproved. This rules out certain kinds of propositions of the deductive economics: namely, those which insist on being universally true, with the result that they become tautologies, so that any kind of observed behavior will fit them as well as any other kind. For such statements an inductive economic theory can have no active use, and the more closely economic theory gets in touch with inductive studies, the more will its statements take on new forms, becoming less tautological and more quantitative.



For instance, the "marginal producer" is being translated into the "bulk-line" producer as figures of costs of production make inductive studies possible. We used to be told: "Price is governed by the cost of production of the marginal producer." Who is he? "He is the producer who makes no profit: that is, whose cost of production is equal to the price." Such a statement needs no verification and tells nothing which could be verified. In place of this, inductive studies make their statements in some such form as this: "Price is commonly such that from ten to fifteen percent of the output is produced at greater cost and the rest at less." [1]

Or, we are told that price is fixed at the point where supply and demand become equal. Supply turns out to mean the volume of goods that holders are willing to sell at any given price (implying a demand at that price) and demand is the volume of goods that buyers are willing to take, if offered at a given price (implying that someone is willing to sell that much at that price; in other words, implying a "supply" equal to the "demand"). Such a proposition is self-evident, and of no use for purposes either of prediction or verification. It is only as common sense or induction adds descriptions of the behavior of "supply" and "demand" that the proposition has meaning attached to it, by a sort of associative process, and becomes a vehicle or symbol of truths which its literal formulation does not categorically denote.

Some forms of the doctrine of marginal utility are even more clearly tautological. Our old friend, the "economic man" is becoming very self-conscious and bafflingly non-committal. Instead of introducing himself to his readers with his old time freedom, he says: "I may behave one way and I may behave another, but what is that to you? You must take my choices as you find them: I choose as I choose and that is all you really need to know." The poor thing has been told that his psychology is all wrong, and he is gamely trying to get on without any and still perform as many as possible of his accustomed tasks. He has become a symbol, rather than a means of description or explanation. Yet this non-committal treatment of economic choices seems to be of immense import to those who have become accustomed to attach much of their thinking to this symbol.

Human behavior in economic life is so many-sided that if we insist on summing it up under simple formulas and also insist that

[1] This concept is developed in articles by Taussig, "Price Fixing as Seen by a Price Fixer," *Quart. Jour. Econ.* Feb., 1918; "Price Fixing and the Theory of Profit," *Quart. Jour. Econ.* Nov., 1919 and by Kemper Simpson, *Quart. Jour. Econ.* Feb., 1921, and May, 1923.

these formulas shall always be one hundred per cent accurate, the only ones that can satisfy these requirements are in the form "whatever is, is"; preferably camouflaged into a semblance of meaning. A letter-perfect description of the economic world is impossible.

And not only that: it would also be largely useless as a form of general economics, because it would not generalize enough to assist the mind to an understanding. General economics must simplify in order to interpret; otherwise its description will be just as unwieldly and baffling as the world itself. Thus theoretical economics must steer a course somewhere between what is futile and what is impossible. It will be a never-ending search for generalizations that are significantly true, and for that very reason are often neither one hundred per cent accurate, nor universally applicable.

II

A PRAGMATIC VIEW OF ECONOMIC TRUTH

1. SELECTION AND EMPHASIS

This simplification lays upon the theorist a great burden of responsibility for the character and influence of the kind of selection he sees fit to make. It robs him of his defense of scholarly detachment, when critics assail him, for instance, on the ground that his doctrines are out of touch with movements of reform and surgings of unrest. He may answer that he is not supposed to be in touch with them, in his capacity as a scientist; he is supposed merely to furnish a wholly objective description of things as they are. But he is open to the rejoinder that, so far as his description is selective, it is not wholly objective. He selects things that are significant, and significance is at bottom a matter of some underlying purpose.

Some things are significant for one purpose, and some for another. A careful thinker always wants to know for what purpose a definition is to be used before he will admit that it expresses the essential and significant features of the thing that is to be talked about. "Value" (as actually used) means one thing for purposes of taxation and another thing for purposes of regulation, and there are similar varieties of meaning covered by the terms cost, wealth, capital and income. Each term covers a related family of ideas, so that it comes to be of the essence of sound method to choose the particular idea that is appropriate to the purpose in hand, and to

avoid all conclusions based on a merging of this idea with others in the same family.

This sort of selection is guided by something different from the abstract and disinterested search for pure truth or pure accuracy of description, which so many theorists would like, in the interests of scientific standing, to achieve. There are always vastly more aspects capable of analysis, vastly more distinctions capable of being used as the basis of reasoning, than the theorist can possibly organize into a systematic body of thought, and more than the hearers can grasp as a connected whole.

In living economic theory the investigators find that their best possible efforts cannot exhaust the material that is of vital importance in its effect on the issues of their time and the needs of their age, and they tend to concentrate upon these aspects of things, not because other aspects do not exist, but because they appear less important. In an economic theory that is not living, this selection is governed by tradition, by professionally vested interest in an existing stock of doctrines and methods, and sometimes by the line of least resistance toward deductive studies, because they yield definite results more readily than inductive, and with less labor of gathering data. But the selection is never governed by the sheer search for truth, for the search for truth is not a principle on which one may decide what parts of truth to include and what parts to leave out. Thus the "realistic" painter who paints life in terms of dung-heaps is selecting; life has other things in it than dung-heaps. He may select the dung-heaps because he is disgusted with the other artists who insist on leaving them out. In that case his selection is governed not by what his subject matter is, but by what the other artists have painted, or said, or written, about it.

Take the statement that men seek their strongest interests, combined with a definition which says that men's strongest interests are whatever things they seek. When we come to put this statement in a form that has some meaning, as for example, when one says that every man is a better judge of his own interests than anyone else can be for him, we are instantly faced by the fact that this is not always true, but that the opposite is true in some cases. Now, as far as the practical usefulness of theory is concerned, the important thing is whether or not a generalization like this is likely to be used in cases to which it does not properly apply, or only in cases in which it is true. Such a statement may be safeguarded in two ways. It may be carefully qualified, or the situation may be such that qualification is not necessary.

2. THE IMPORTANCE OF TIME AND PLACE

If all the doubtful issues of the time and place are of such a sort that they can best be settled by assuming that each individual is always the best judge of his own interests, or *vice versa*, then, *so far as that time and place are concerned,* one of these sweeping generalizations is wholly true and needs no safeguarding other than the fact that in that time and place only one kind of issue is present. This happy state of things never really comes to pass, but something fairly close to it sometimes is true of the watchwords of strenuous fighting movements. If the existing order is biassed so far in one direction that all that can be accomplished in the other direction will not restore the balance, the party of protest will adopt as a watchword a strong and sweeping statement of the opposite principle, without weakening it by cautious delineations, stating just how far it can properly be carried and what concessions will have to be made. "Men do not follow an uncertain sound into battle."

On the other hand, the existing order always has some value, if only by the fact that we are used to it, and if the question at issue is whether the existing order shall or shall not be wholly discarded in favor of some untried invention sure to entail enormous injustice and suffering, and uncertain of ultimate success; then sweeping dogmas of a conservative sort come naturally into use. In a way, this is proper as it is natural. So far as concerns the issue raised by a party of wholesale revolution, the most important truth about the existing order may consist, not in minor defects and abuses, and not even in the fact that the best possible system would be very different from the system as it stands, but rather in the fact that it does harness and utilize some very powerful forces and get some very valuable results, and that these would be destroyed by the proposed revolution. The real truth in the defense of the existing order may be, not that this order is ideal, but that the counter proposition would be still worse. Thus Adam Smith did not claim that free enterprise worked perfect results, but rather that the worst evils sprang, not from free enterprise but from the mistakes of governmental interference. Hence the significant truth of a proposition about the existing order depends, not on that order alone, but on the character of the substitutes which political organization, scientific knowledge and human imagination place within the bounds of serious possibility.

It is probably true that economic conceptions have mostly been

framed with reference to particular errors or evils which they might serve to combat. This obviously is true of the myths and slogans that animate fighting parties, but it is no less true of the most carefully qualified abstractions. The qualifications recognize passively the existence of facts and forces which the abstraction does not actively interpret.

For that reason new issues must bring forth new selections of significant material embodied in new myths, new fighting slogans and new abstractions. It is this which determines the range of the broader generalizations in the "social science of business." Each generation of economists succeeds to a new assortment of practical problems to which its doctrines are to be applied.

It would be vastly interesting, did space permit, to apply this method of interpretation to the ideas of Medieval economists, Physiocrats and Mercantilists. To one who has been trained to regard these ideas merely as examples of the perverse errors of the unenlightened human mind, their appropriateness to their particular environments comes as a startling revelation, tending at once to lessen one's disrespect for these "fallacies" and to weaken one's trust in the absolute verity or eternal adequacy of the doctrines which the peculiar environment of the nineteenth century has brought into a dominant position in economics.

3. THE ENGLISH TRADITION

We inherit the tradition of Adam Smith and Ricardo, representing the birth and early infancy of the industrial revolution, when the forces latent in this new economic system were struggling for room to develop, and had hardly begun to foreshadow the miracles they would ultimately bring to pass. For the beneficiary control of these forces, class interests and social systems were already struggling; the combat lying broadly between liberal and humanitarian notions of popular welfare on the one hand, and the landed, mercantile and militaristic interests on the other, by whom the poor were more or less frankly regarded as instruments of production and "food for powder."

The first combat was against the national restrictions of the mercantile systems, together with local and craft restrictions surviving from the smaller-scale medieval economy. Here a group of abstractions were developed, serving the ends of economic freedom, such as the idea that both sides gain in an exchange, that consumable goods are the end of the economic system, that the consumer can exercise

the best discipline over the producer, and the tacit assumption that demand in the market is an index of social need and economic worth.

The idea of mutual gain serves to combat the medieval notion of exchange of absolute values, wherein one side gains only as the other loses. Mercantile notions of foreign trade carried this same assumption: one nation gained only as another lost, and a balance of trade favorable to one must be unfavorable to the other. The conception of consumable goods as the end of production served to combat the warped notion of exports as a national gain and imports as a national loss, which went with the doctrine of the balance of trade. The idea of the consumer as the best source of trade discipline was urged, not as against social humanitarian policies, but against gild privileges and gild restrictions of an essentially monopolistic character. And the idea of demand as a measure of economic worth, warped as it is when judged by humanitarian standards, served in this period to combat standards which were in every respect farther from the truth. It left ample room for such "non-economic" values as national defense, but served very effectually to puncture the sophisms used to mask the economic burdens of protection.

As over against the chief doctrines they had, at the time, to combat, these classical assumptions were true. If they had been surrendered, it would not have been in favor of modern policies of social welfare and democratic solidarity, for such did not exist at the time. They would have yielded the field to the interests and sophisms of class exploitation; and they retain essential truth to just the extent that these interests and sophisms retain a dangerous degree of vitality. But these early assumptions of liberalism ignore many democratic and human values which are now striving for practical recognition, and the adjustment between these limited truths and others less limited is one of the central conflicts of modern economic thought.

Another conception is the production of "utilities of form, time and place." This expresses a truth as over against the idea that only the creation of material goods is productive. It is, however, only the beginning of an analysis of production from the standpoint of utility. Akin to this is the concept of marginal utility, which was bound to come from the moment the early economists compared gold and iron, or coal and diamonds, and concluded that value and utility were not quantitatively related. This drew attention to an unsolved problem and made some solution inevitable. As against

the older blank negative, the doctrine of marginal utility expresses a truth, partial, and expressed with a mathematical exactness not found in nature, but nevertheless important.

The doctrine that "industry is limited by capital" served to emphasize the contention that industries created by protection are not a net addition to the productive forces of the nation.[1] It is valuable for this purpose, even though not unqualifiedly true, but it becomes a stumblingblock when we come to the business cycle, where varying rates of exploitation are of the essence of the problem. The pragmatic bearing of the Marxian "surplus value" theory need not be pointed out, nor the fact that the Ricardian statements which formed its logical basis would have been modified and safeguarded if Ricardo had foreseen to what use Marx would put them. No less obvious is the appropriateness of the "marginal productivity" theory as an answer to Marx on the one side, and to wage-fund extremists on the other.[2]

Adam Smith was born into a world whose official economics was utterly distrustful of free exchange, at a time when free exchange was demonstrating its ability to rise superior to the crude and misdirected forms of regulation then prevailing. He became aware of the wonder of unintentional coöperation in which the frankest selfishness yields surprisingly tolerable results through the efficient but unplanned organization which the system of exchange carries with it. He noted the genuine service rendered by the price that equates supply and demand, chiefly by noting its superiority to those crude attempts at regulation which furnished his standard of comparison. He grasped the element of mutual aid running through exchange, saw its organizing possibilities and contrasted these with the crippling effects of contemporary sorts of interference. Given all this, the message he had to convey to an unseeing world, and the dominant abstractions of his system—suited to convey this message—were foregone conclusions. The validity of price as an economic organizing force is his contribution, not its imperfections.

The most one-sided parts of such a message are not the parts that deal consciously with the question whether private enterprise is better than public enterprise in any given case, but rather the parts where the writer feels himself to be abstractly and impartially describ-

[1] John Stuart Mill specifically makes this use of the doctrine: *Principles of Economics*, Book I, chap. V, § I, 64, Ashley ed.

[2] Since writing the above, I note that Fetter explains the development of the marginal-subjective doctrine as a conscious reply to Marx. See *Jour. Pol. Econ.* xxxi, 602–5, Oct., 1923.

ing the economic system "as it is." For here he is not on his guard as to the use or abuse that may be made of his doctrines. One of the best examples of this unconscious attitude may be found in Smart's *Second Thoughts of an Economist* where he says:

"What I, for my part, found in Political Economy was a science whose main object was *not* defence of any particular system, *but explanation of how men, consciously and unconsciously, work into one another's hands,* and get and give each his daily bread. I saw it analysing what we do in the every-day life of making an income and spending it; gathering up facts into categories and generalisations; drawing deductions of what men in general will do in the future from observation of what they have done in the past. All this seemed to me as impersonal as anatomy, as the writing of history, as the observation of the tides—and as necessary."

In other words, political economy does not defend the existing system but it explains the elements of coöperation in it; which are the elements everybody approves of. It is in fact a highly selective and partial theory which Smart seems to have found as impersonal as anatomy, and it does credit to his saving sense of relevance to the needs of humanity that he felt something lacking in this theory and was moved to step outside of its limitations in his last book.

These limitations are chiefly the work of later writers than Adam Smith, who seldom allowed his thinking to be cramped by its own machinery. But such conceptions become more formalized and crystallized with the passage of time, and structures of deduction are increased upon them, becoming ever more elaborate and more brittle. This happened to the free-trade economics, long after its chief active purpose had been attained in the freeing of trade from mercantilist shackles, and it had subsided into the more passive rôle of furnishing a *prima facie* case for the competitive order—now the established order—as over against projects of revolution or of fundamental reform. Meanwhile the new generations were arising.

4. MODERN ANTITHESIS OF THE ENGLISH TRADITION

What is their vision? The marvel of spontaneous coöperation is no marvel to them. Their textbooks have presented them with its concentrated essence in a purity more or less frankly unreal. This furnishes their intellectual point of departure. The direction in which the world about them departs from this formula is toward apparent variations from type, which fail to produce the expected efficiency and instead cause waste and social loss rather than pure mutual gain in the process of free exchange. The older student was

interested primarily in the fact that prices do reach an approximate equilibrium. The newer is interested in their erratic and unruly movements—also in the bad quality of housing accommodations as a disastrous and unnecessary phase of *laissez-faire,* in the effects of seasonal fluctuations of industry as an imperfectly compensated cost of production, in the wastes of competition and in methods of diminishing them.

The older theorist had written down as his "balance carried forward" a theory of the pernicious effects of free enterprise and such tolerably good tendencies as he discovered were clear gain. The modern theorist carries forward a theory of one hundred per cent efficiency for competitive institutions and is alert to all shortages, for they appear as a clear deficit. Thus it is the most natural thing in the world that Veblen should reverse the classifications of "orthodox" economics, finding the normal workings of business enterprise in those things which the older economists classed as disturbing elements causing departures from normal.

Orthodox economics undertakes to interpret equilibrium: Veblen undertakes to interpret progressive change. And in the social world this is much the same as saying that orthodox economics studies the assumptions of contentment while Veblen studies the assumptions of discontent; both of which are undeniable facts. Since undeniable facts are difficult to ignore, the net result is very largely to call them by different names.

So when Veblen says that the inherent nature of business is parasitism and that any modicum of service rendered is rendered incidentally and in spite of the inherent nature of business; and when orthodox economics says that the inherent nature of business is service, and that any modicum of parasitism that may remain is an incidental perversion of the true spirit of the institution—they are not so much contradicting each other as selecting different things to talk about. Veblen is talking about the nature of the pursuit of profits; and the beneficial effects of competition, where competition works beneficially, are an incidental and very partial check (and possibly a temporary one) on the natural tactics of the pursuit of gain. Orthodox economics is talking about the nature of competition (or rather of an "ideal" form of competition) as a check on human selfishness in the pursuit of profits and to them any failures of competition to produce its full effects appear as incidental disturbances. In a general way most economists admit the same general mass of facts, but pick out different ones as the central axioms of their systematic economic theorizing.

While Veblen admits a modicum of serviceability under private enterprise, he does not seriously undertake to explain how this perversion of the essentially parasitic nature of business enterprise comes about. He does not focus attention on the nature of the checks on selfish exploitation, embodied in customs, morals, rights of property and person with the negative and positive duties they involve, and in that complex, self-contradictory but very real institution of economic competition.

On the other hand, the older economics more or less tacitly assumes that these checks do their work perfectly, and its conception of competition may be characterized as a simplified and unattainable ideal. Thus we have two antithetical doctrines, both at least partially true. The synthesis which can unite them lies largely in the realistic study of the social checks on private self-interest; their nature, adequacy and inadequacy, success and failure, actualities and potentialities.

Can it be that human nature is so built that it demands the clash of opposing half-truths in order to raise the issues from which it may work out a closer approximation to the truth? In that case, the only truths we can ever arrive at consist of these half-truths; and even ostensibly contradictory propositions might both be "true," in this provisional fashion, which is the only fashion of truth we can attain. A half-truth outgrown becomes an error; till then it was truth. Or, as dirt is only matter out of place, so error is only truth out of place—one of these human half-truths out of its appropriate environment and application.

III

NON-EUCLIDEAN ECONOMICS: AN EXPERIMENT IN THE SIMULTANEOUS TRUTH OF OPPOSITES.

From the foregoing it appears that there are systems of economics with axioms as far removed from each other as the geometry of Euclid and the non-Euclideans; perhaps as far apart as the conventional physics and Einstein. As abstract systems, they describe different worlds, and Veblen's theory of invidious prestige might be called a theory of economic relativity.

Just what is meant by "non-Euclidean economics" in the present instance? The question can be best answered by taking eight axioms which represent in a general way the traditional position on a number of central points, and inverting them. This is done with no

idea of denying the truth of these propositions, but it does raise the question whether their antitheses do not contain a more urgent and vital truth for the present generation. This is not a mere game of logical gymnastics; it is the natural result of studying those facts of human existence which Euclid, as represented by these eight axioms, somehow fails to interpret. Probably none of this matter is new; but, after all, economic theory consists largely in organizing and interpreting known facts rather than in the independent discovery of raw facts hitherto unknown.

1. Economics is the science of wealth, and wealth consists of things (a) useful (b) limited in supply (c) exchangeable (d) appropriable.

2. Consumption is the end of economic activity and production is a means to that end.

3. The standard of economic service is the gratification of human wants through the increase of marketable goods and services.

4. A bargain between two persons concerns primarily those two persons, and only incidentally, under special conditions, becomes "affected with a public interest."

5. As a general rule, cost varies in proportion to output: "overhead costs" which are independent of output are the exception and arise in connection with large fixed capital outlay. This proposition is not definitely stated so much as implied in the typical treatment of the laws of price, where overhead costs are treated as a disturbing factor in special cases which Mill, for instance, speaks of as "rare and peculiar."

6. Private enterprise is necessary and efficient because people will work and sacrifice for their individual ends where they reap the fruits themselves, and will not work as well for a collective end.

7. The rational foresight of individuals is at the basis of individualistic economics.

8. Capital, including machinery, consists of instruments of production utilized by human beings for the production of wealth.

Let us examine these eminently respectable propositions from a pragmatic standpoint, *via* their antitheses. Space permits little more than mention of the first six, and a very brief development of the last two.

Proposition 1. Economics is the science of wealth, and wealth consists of things (a) *useful* (b) *limited in supply* (c) *exchangeable* (d) *appropriable.*

The alternative proposition is that the most important subjects of economic study, while useful and limited in supply, are not appro-

priable and not fully exchangeable, and thus are not wealth in the full sense.[1] For instance, the morale of labor constitutes today one of the most vital of economic problems, but it is not exchangeable wealth. Industrial knowledge is not fully appropriable, while that broader body of social-economic customs by virtue of which the average individual is enabled to go his way without meeting economic calamity at every street-corner—this vital community asset is suffering serious obsolescence as the result of industrial "progress." This cost of industry is not compensated, the necessary rehabilitation demands the best thought and effort of our generation, but this is not exchangeable wealth. Wealth as property consists of a bundle of "rights"—i. e., interests protected by society—but there are many interests unprotected today which are asking protection and which may be protected tomorrow.[2] Tomorrow, then, they will be appropriable wealth, but not today!

Since the consequences of this have been developed by a number of writers, I will merely mention one very interesting corollary: namely, that in the marginal-productivity economics power to produce cannot exist apart from power to withhold. Many things may be useful and limited in supply, but only those which the owner has the option of withholding have a marketable marginal product. What is marginal productivity? It is essentially the power to make a differential addition to the income of an enterprise. (This means to make this income greater if one grants the enterprise the use of the productive factor he controls than it would be if one withheld this productive factor.) In this sense an invention, once made public, is not "productive," and the inventor is not a productive factor, with respect to any past invention, except as he keeps patent rights which enable him to withhold it from the market, and hence to bestow it on the market. He cannot freely bestow it if he cannot also freely withhold it. Thus the meaning of "productiveness" is to some extent governed by the system of legal rights, and may be changed by a change in this legal framework within which economic life is set. Other applications of this proposition are interesting, but we must pass on.

[1] The germ of this proposition is at least as old as John Stuart Mill (*Principles of Political Economy*, Book V, chap. XI, sec. 14); Sidgwick also develops it (*Principles of Political Economy*, Macmillan ed., 404ff.) and it plays an important part in J. B. Clark's *Philosophy of Wealth* as the "theory of inappropriables."

[2] See Ely, *Property and Contract*, also the writings of Roscoe Pound.

Proposition 2. Consumption is the end of economic activity and production is a means to that end.

This proposition may be broadened; increased productive power is used to make working hours shorter and to some extent to make work easier and more pleasant. This is in general harmony with the proposition that production is looked on as a necessary evil and a means to an end: the less time we spend at it the better. The general proposition seems obvious, and is obvious from the point of view of the individual. When it comes to society's interest, the question is not so clear. Society's purposes are supposed to have something ethical about them. To take consumption as the end of all things corresponds to hedonistic ethics, whose standard is the receipt of pleasurable sensations, but the more modern ethics emphasizes rather the well-rounded development and use of human faculties. It is an active and not a passive standard, a standard of output of energy and not of receipt of sensation.

This makes it seem that our activities are more important than the passive pleasures we receive, and the activities that really develop us most are those where we are faced with the biggest difficulties. This means, commonly, things we would not voluntarily do simply for the fun of doing them. It means work, in one form or another, rather than play. The conclusion is that the quality of the activity involved in work is more important as a positive social value than the quantity or quality of consumption.[1]

There is a twofold need: for work of a sort which, if a man gives his best to it, will develop and not crush him; and for incentives that will make him give his best. And the two needs are more nearly one than economic theory is accustomed to assume. Starvation, poverty, and perhaps even ambition for increased wealth have successively worked themselves past the point of diminishing return as incentives for the mass of labor, and the search for new incentives must focus on other things than wage scales. In this respect, the worst evil is to deny those incentives which represent what man recognizes as best in him. If selfish incentives cease to work, that is a failure: if unselfish incentives have no opportunity to work, that

[1] This idea, again, is not new. It goes back to Ruskin and William Morris, and back of them to the Greeks, who graded occupations according as the kind of activity involved was or was not consistent with the "good life" as they saw it. Modern studies of human nature are trying to give us more scientific standards of judgment in these matters, and the results so far are promising and valuable.

is a tragedy. The partial breakdown of the traditional selfish incentives in industry, which is now disturbing many minds, may prove a blessing in disguise, and one of the greatest of social opportunities.

Proposition 3. The standard of economic service is the gratification of human wants through the increase of marketable goods and services.

This does not intend to deny that the development of good types of human beings is a more important thing, but it singles out increased wealth as the economic way of making possible the development of the best human type, leaving humanity to use its power as its wisdom or folly may suggest.

In this matter economics has tried to keep itself separate from ethics and to take the attitude that it is not concerned, as economics, with the wisdom of the use men make of wealth. Its ideal is well expressed in the maxim of Francis Bacon, quoted by Jevons in the introduction to his *Theory of Political Economy:* "While philosophers are disputing whether virtue or pleasure be the proper aim of life, do you provide yourself with the instrument of either."[1]

It has, then, as an ideal, a sort of undifferentiated power over nature which man is to secure, and which he can then put to any use, good or bad. The increase of this power is economic gain: the quality of the use made of it is a separate question and not an economic one. This is a very natural position, but there is one trouble with it. The methods of production which increase our power have in themselves qualitative effects on human living of a very direct sort, some of which have already been mentioned. And these effects on the quality of life are not marketable commodities capable of being weighed in the same financial scale with the increased supply of commodities which modern industry furnishes.

Moreover, it may be argued that the tendency of population to increase has the effect of neutralizing the greater part of man's increased productive power, so that by far the greater part of it goes in maintaining increased numbers in the face of the principle of diminishing returns, and the increase in per capita wealth is but a small fraction of the percentage of increase in our essential power over nature. One might go farther and say that it is a positive injury for humanity to learn enough about the arts of production to use up all the best of the earth's limited natural resources

[1] This is the concluding sentence of Jevons' "Introduction" (4th ed., Macmillan, 27).

and occupy all the available territory, until they have learned how to put them to some better use than, for example, they have been making of them in the past nine years.

I am not advocating inefficiency, though there are some sorts of inefficiency for which a good deal might be said. So long as war exists, any civilization that systematically practiced inefficiency for the good of future generations would be speedily displaced by one with less refined ideals and more immediate horsepower. Efficiency is inevitable and, in moderation, not undesirable. But what I am suggesting is that, instead of taking the quality of man for granted and focussing attention on quantity output, it may be more pertinent for the social student to take quantity output for granted—business will not neglect that—and direct his chief attention to the qualitative effects on humanity of the things they do in their inevitable (but largely self-defeating) striving after increased per capita wealth.

One might suggest that in the economy of nature and of her creatures means and ends are reversed: that the creature's ends are nature's means of gaining her ends, and the activities which serve the creature as means of attaining his ends are the things nature is really after.[1] Primitive man is interested in stilling his hunger and to get food he endures enormous fatigues, taxes his rudimentary ingenuity, and perhaps makes a minute improvement in the stone axe or the bow. Nature is not interested in stilling his hunger; in fact, she takes very effective measures to see to it that he shall be chronically hungry in order that he may continue to endure fatigues, to tax his ingenuity, to struggle, and as a result to develop biologically into a type with higher faculties. Now that we have supplanted nature's jungle with our man-made jungle of mines, factories, railroads, hotels, jails, hospitals, almshouses and what not; who is strong enough to do what the older jungle did for our ancestors—overrule our purposes for our own good and save us from the danger and possible biological disaster of getting what we think we want?

Proposition 4. A bargain between two persons concerns prima-

[1] If this figurative personification of nature appears unscientific, nature's purposes with man may be translated as the requirements of man's biological development, which undoubtedly contain a sounder standard of human welfare than the gratification of his immediate conscious desires. Adam Smith held that nature implanted in man instincts which were wiser, for the good of the race as a whole, than his reason. See *Theory of Moral Sentiments*, Part II, sec. I, ch. V, note, and elsewhere.

rily those two persons, and only incidentally, under special conditions, becomes "affected with a public interest."

The antithesis to this proposition is clearly involved in what has already been said. The most important effects of private bargains consist in the part they play in the qualitative evolution of the personal characteristics and social relations of the human race at large. Their immediate direct effects on appropriable goods and services may well be regarded as things requiring secondary attention from economists in the present stage of human history. Even to increase tangible wealth the prime requisite is to control the business cycle—clearly a community problem—and to improve the relation of labor to industry. *All industry and trade is primarily affected with a public interest,* and only certain phases of it may be regarded as of purely private concern.

Private contract is good, not because it deals with things of purely private concern, but because there is no sure social judgment on these matters. Society does not know what it wants, and private contract furnishes an elastic method of experiment which has many advantages over political tinkering. Its greatest present task is to remake the constitution of industry in a tentative and voluntary fashion. A society formed by "social compact" is possible in the economic realm, grounded upon a social organization developed in other ways, and this social compact is the most significant form and aspect of "private bargaining" at the present time.

Proposition 5. As a general rule, cost varies in proportion to output: "overhead costs" which are independent of output are the exception and arise in connection with large fixed capital outlay.

As an alternative, consider the proposition that overhead costs are not merely the general rule but are universal, and that the costs that are "direct," or "variable" or "prime costs" from the standpoint of the employer are overhead costs from the point of view of society. Every laborer is his own "overhead" and has his constant costs to meet, whether he is working or not. Society has so much productive power. It cannot avoid the cost of either (1) maintaining this productive power, including the human beings who compose most of it, or (2) seeing it depreciate. The power of the entrepreneur to reduce expenses by ceasing to buy materials and reducing his working force, where this means unemployment, is for the most part a financial illusion arising out of the fact that the individual employer does not have to pay the constant costs of the

industries that make his materials, or of the labor he turns off.[1]

This principle has many possible applications, largely in the direction of placing the burden of labor's overhead cost on those bearing chief responsibility for the industrial cycle, and where it will have the greatest effect in stimulating people to do things to relieve the irregularities. It is one tremendously important instance in which social accounting and business accounting diverge and in which the social accounting is not yet organized and explicit.

Proposition 6. Private enterprise is necessary and efficient because people will work and sacrifice for their individual ends better than for a collective end.

For an antithesis to this, one need not deny individual selfishness. But private enterprise no longer depends on it in the old simple way. One need only remember that the dominant economic personalties today are corporations and labor unions—both types of collective personality. Even the entrepreneur function has become split up into a large group of functions, shared by different persons and even by different corporate entities—for example, the banks. The older proposition is still true, in that the employees of these corporations do not work as hard nor as faithfully as a man "working for himself." Nevertheless the advantages of large scale production have outweighed this handicap and falsified the earlier prophecies as to the limited scope of corporations in economic life.

But these associated personalities act through real persons, and in order that the corporation should act selfishly, following its corporate interests, the real persons composing it must act loyally in the interest of the collective whole. This loyalty has, indeed, become a dominant quality of the modern economic man, vitally necessary to the continued truth of "individualistic" economics. The ability of corporate organizations to stimulate loyalty, or to make loyal behavior the best policy, or both, is the vital necessity of private enterprise. We have now to compare, not private selfishness with collective loyalty, but the business versus the political methods of securing this loyalty, which is equally necessary for private or public enterprise.

Proposition 7. The rational foresight of individuals is at the basis of individualistic economics.

[1] This general point has been developed by G. P. Watkins, "A Third Factor in the Variation of Productivity," *Amer. Econ. Rev.*, v, 753, 770–77. The present writer has developed it further in a paper entitled "Some Social Aspects of Overhead Cost," *Amer. Econ. Rev.* xiii, *Supp.*, 50–59, Mar., 1923.

In particular: business men know the "best combination of factors" and the marginal productive worth of different factors, and on this the efficiency of individualism depends. The question at issue is not whether people in general and business men in particular are thus intelligent, but whether an economics founded on the idea that they are is really a sound basis for individualism.

Let us study for a moment a hypothetical society made up of individuals gifted with this degree of intelligence and foresight. Would this be peculiarly favorable to individualism? Business would be highly efficient, it is true, but there is serious question how long beings with this much foresight would continue to compete. Such beings would not let the coal business run in the present wasteful fashion. They would long since have integrated the industry to a point where wagon-mines and backyard wheelbarrow mines could not offer serious competition to the organized large-scale producers. And there would be a Federal Commission.

Perhaps in this hypothetical society employers and employees in, let us say, the building trades, might both get tired of the competitive struggle and unite to assist each other in excluding competitors. If they were very foresightful they might cover up their tracks so well that even Mr. Untermyer might have difficulty in getting evidence enough to make a case. The "best combination of factors" in this case would consist in putting some of the very best brains to work on covering up tracks, and the marginal worth of high-grade brains in this occupation would be extremely high. Since the employers would know all this, highgrade brains would be so employed and lavishly rewarded. On the other hand, the marginal worth of brains spent in detecting such conspiracies would also be very high, and government would know this (by hypothesis) and would bid against private enterprise for the same grade of brains. Thus a large part of society's ability would be devoted to this interesting game of hide-and-seek; to making and contesting valuations of properties; to checking up accounts, inspecting products to enforce standards of quality and service, and many other similar occupations; and their pay would absorb a considerable part of the national income.

Meanwhile, if people in general could choose intelligently for the future they could and would vote intelligently and select able and honest officers of government, and government departments would be very efficiently run because their heads would know the "best combination of factors," and the "marginal worth" of talent, and

would be able to get appropriations that would enable them to bid for it. Their budget system, based on knowledge of the relative marginal worth of different lines of public expenditure, would furnish something society has long needed—a system of social accounting in terms of national welfare.

Thus we should have on the one hand enormous waste in the attempt to control private industry, and on the other hand government departments quite as efficient as private concerns and able to avoid the wastes and duplications either of competition or of regulation. Under these conditions any people with such intelligent foresight as we have assumed could not fail to see the obvious advantages of national collectivism, and we might expect to see it adopted as rapidly as an efficient government bureau could handle the necessary accounting.

But suppose, on the other hand, we assume a population of little foresight, who therefore cannot safely depart far from custom, who are governed much by imitation and suggestion from their fellows, who learn only by making mistakes and being hurt, and who do not know the "best combination of factors" nor the marginal worth of different factors of production. In such an imaginary society, private production would not be very efficient, judged by absolute standards of what is technically possible. On the other hand, a considerable amount of competition would survive for a long time, perhaps indefinitely; partly because it is customary, partly because competitors do not look far ahead, and partly because they are influenced by the suggestive force of a moral code which considers monopoly as contrary to the public interest.

With competition, however, goes a weeding out of the least efficient, which means eliminating the widest departures from the "best combination of factors" and from the systems of paying factors of production according to their marginal worth to the employer, and placing them in industry on the same principle. The survivors would be those who, by luck or intuition, came nearest behaving as they would if they had known what the "best combination" was and what the marginal worth of productive factors was. The force of competition would put pressure on business to install cost accounting systems in order to lessen its ignorance of how much productive factors are worth, and to employ engineers and efficiency experts who, although they may not know the absolute "best combination," may at least be able to devise ways of improving the combination that exists. Thus there would be forces working

in the general direction of efficiency and of a rough approximation to an organization on the basis of marginal productivity.[1]

On the other hand, government departments would not only suffer from not knowing what the "the best combination of factors" was, but they would lack the saving grace of competitive elimination to work automatically in that direction, or to put pressure on their administrative heads to install efficient systems of accounting and research. In such a purely hypothetical society, we might expect that the accounting systems of government departments would be far inferior to those of private business; and would be, in fact, inadequate to show how much public services cost, let alone the marginal worth of different productive factors taking part in those services.

Not knowing how much factors of production were worth, government would tend to underpay the highest employees and fail to secure the highest talents in competition with private industry. Moreover, a people of this mental type would be less able to vote intelligently than to buy goods intelligently, since voting makes peculiar demands on the powers of foresight, while the buying of goods can be much less wastefully done by the method of trial and error. Most marketable commodities are renewed far oftener than is the incumbent of a political office, and of those that are not, few commodities are selected without more intelligent study of values than the average voter makes of the average candidate on the average American long ballot.[2] Thus in this hypothetical society there would be less chance of getting able public officers than able business men. And though the absolute efficiency of private enterprise would be far less than in our first hypothetical society, that of public enterprise would suffer still more. In the second society, private enterprise would be more efficient than public.

The tendency to combination would undoubtedly appear, though restrained by the custom of competition and the moral mandate for it. The attempts of government to curb combination would be largely abortive, but the people might still prefer a moderate degree of exploitation to the inefficiency of government operation,

[1] Professor J. B. Clark has, in lectures, made the point that the marginal productivity theory does not require perfect knowledge on the part of business men of what "marginal products" are; but that the force of competitive selection works in this direction automatically.

[2] Cf. T. N. Carver's suggestive comparison of political and economic competition in his *Principles of Political Economy*, 328, and in his *Essays in Social Justice*, 111–125.

or to the effort and uncertainty of conceiving and working out some other substitute for individualism. After some trying experiences, business would probably learn to keep its exploitation within the limits of the people's toleration, not so much from shrewd calculation as from natural hesitation to break with custom and morals, and from the habit of feeling one's way in any new policy. And thus individualism might continue.

Thus it appears plausible that the strongest basis for individualism is not the intelligence of individuals and their irrevocable devotion to the pursuit of their own self-interest, but rather their stupidity and their susceptibility to moral suggestion. Individualism may be regarded, not so much as the system calculated to get the utmost out of a people of extremely high intelligence as the system in which human stupidity can do the least harm. All of which is not so very new, but is more akin to the general trend of Adam Smith's economics than to the Austrian school, and really harks back from marginal utility economics to the earlier classical proposition that individuals can choose for themselves—not with absolute accuracy—but better than any government agent can do it for them. This is a theory of relativity rather than one of the absolute efficiency of individualism as a system by itself.

After all, at the present time one of the most important facts concerns, not the general level of intelligence, high or low, but the differing degrees of training and special information on different topics; the extent to which the specialist in this age of specialists has information beyond the unspecialized man in the street, and the ability of the unspecialized "people" to cope with the specialist who has his axe to grind. This is one of the very large problems for the "economic man" of the twentieth century.

Proposition 8. Capital, including machinery, consists of instruments of production utilized by human beings for the production of wealth.

Let me suggest the alternative proposition that human beings are instruments of production utilized by machines for the machines' increase and biological development. This is not a new idea. Samuel Butler carried it to the point of suggesting that machines might develop consciousness and thus enslave mankind, though in these days of behaviorist psychology the question whether the ruling race possesses consciousness or not bids fair to become obsolete. A more real question is: how many and how important and far-reaching are the things the machines have done to us which we did not intend nor foresee, compared to the things we specifically employed them to do?

On this point, some things have already been said (sections 2 and 3 above).

Among economists and social scientists, Veblen has described how machines train and educate human beings.[1] A. S. Johnson has pointed out how the nominal captain of industry is ruled by the processes he presides over.[2] Cooley has asserted the existence of impersonal forms of life with life-processes independent of those of the human beings who impinge on them and further their growth, and he mentions industrialism as one of these forms of life.[3] The Economic Interpretation of History implies that the machines control human life and organization in its highest forms.

Machines may be conceived as making bargains with man in which they offer him things he very much desires, and in exchange bind him to serve and maintain them, to eliminate the unfit among them and promote their racial progress, and to alter his own social and political arrangements in whatever ways may be necessary in keeping pace with the increasingly complex social organization of the machines themselves, and in keeping the children of man faithful to the service the machines require. The full nature of the terms of these bargains are not revealed to man until he is so fully committed that it is too late to turn back, and thus the machines outwit him. For example, they took Adam Smith into their confidence, but only so far as suited their purposes. By such methods they have succeeded in imposing on man many things he never bargained for, some of which he finds extremely unwelcome.

Some might think this shows a low standard of honesty on the part of the machines, but we must remember that honesty is the morality of equals toward equals, not of superior to inferior races, and that our own conduct toward inferior races will hardly stand a critical examination. At least machines have not forced their culture upon us by armed violence. Among their own kind, they show a sense of the superior importance of biological progress to immediate gratification and a subordination of the interests of the individual machine to the progress of the race, which demonstrate a clear moral superiority. Seldom or never, as in Arnold Bennett's *Milestones*, does the older generation cramp the development of the younger. They give way without complaint, youth is served, and the interests of mechanical posterity are paramount.

The machines appear to have kind intentions toward man, but to

[1] *The Instinct of Workmanship*, 311–27.

[2] "The Soul of Capitalism," *Unpopular Review*, April–June, 1914, 230–1.

[3] *Social Process*, 6–26.

lack understanding of many of his feelings and needs; as is frequently the case with ruling and subject races. They have revolutionized both work and product, taking the element of universal individual initiative out of both. They have given man unnatural working conditions which are now leading to incipient revolt, and living conditions that go far to defeat democracy. They are responsible for the "industrial cycle," and as long as their own overhead costs are covered in periods of depression, they have not assumed full responsibility for the corresponding overhead costs of human beings. They have largely taken over the drama without caring to preserve what human beings regard as the highest standards of taste, and they have, intentionally or unintentionally, gone far to undermine the church and even religion itself. They have incontinently switched us from a paternalistic to a *laissez-faire* type of government and are now busily switching us back again, according to the temporary needs of the stage of development they have reached. These are merely examples.

As for their methods of maintaining control: some classes they bribe with large rewards, other classes, largely technicians, and technical-scientists, do not need to be bribed: their minds are captured by the material they work in. And the unspecialized "ruling classes," voters or congressmen or others, cannot cope with these specialists, who are left to do more and more of the governing in the shape of the actual working out of things. The ordinary man cannot even speak the dialect in terms of which many of these issues are settled; for example, the accounting language used in settling the justice of street-car fares.

The machines have cleverly limited human coöperation by splitting human language up into many dialects of many specialist groups, so that the highest common factor of intelligibility, so to speak, for humanity as a whole, consists of relatively simple ideas, largely obsolete in the sense of not actively gripping the newer issues. Among these ideas might be mentioned the simple ideas of public and private ownership. As men become more dependent on machines, the latter become able to rule by penalties as well as by rewards; witness our late heatless Mondays and other penalties imposed by failure to develop our railroad system to a continually increasing size and complexity of articulation. Thus mankind moves in directions it never intended, getting largely things it never definitely wanted as the unexpected result of engaging the services of unexpectedly powerful instruments.

What I have called Euclidean Economics, in general, serves the

interests of the machines. It directs attention to the bribe they offer, and away from the conditions they exact. It has countenanced the machines in neglecting to assume the burden of human overhead costs, and in this, as in other matters, by insisting on putting man on a higher level than machines in respect to freedom, it has sometimes put him on a lower level in respect to care for his material needs. This has its fine side, but by teaching man that he is the end of all things, when he is not, his subjection is concealed and thus perhaps perpetuated.

I do not advocate revolting against the machines and abolishing or subjugating them: all I aspire to is a reasonable degree of racial equality. This would make for more friendly relations and would help to allay the distrust of the purposes of the machines which now prevents us from getting all the benefits which they are able and willing to give us. This is peculiarly true of labor, but not of labor alone. We must become far better informed and surer of our own intentions before our dealings with the machine can be characterized by that confidence which marks the bargaining of equals. To attain this we must not merely develop the ability to rise superior, if necessary, to the immediate bribe that is offered us; we must become competent to bargain, as the machines do, with an intelligent eye to our long-run racial and social interests.

These interests are most seriously threatened in the case of labor. The machines tend to confine discretion in industry to the few whom they take into their confidence, while the bulk of labor has largely lost the power to make any constructive contribution to the technique of industry. The job belongs to the machine, and labor feels little responsibility for it. Labor's state of mind and conduct shows the consequences of this, and many laborers appear to alternate between the slave-morality of getting as much as possible and giving as little, and the spasmodic need of exerting power of some sort. Under the circumstances this can only be power to interfere with the orderly progress of industry by strikes or sabotage, since power to improve on the operations laid down by the machines appears to be largely beyond labor's present reach, either for lack of competence, ambition, or opportunity. Racial equality can never be established so long as the bulk of mankind are in this position of undignified and passive inferiority.

The situation demands social organizations capable of exerting the force of constructive human will, enlightened by collective intelligence, *at the point where things are being decided, in the processes of industry itself,* rather than waiting till the decision is made and

then, through our "political" machinery, taking belated and purely defensive action.

IV

MATERIALS OF SOCIAL ECONOMICS

Granted that these two types of economics both contain vital truth: can they be synthesized? In present treatises we find these two currents of thought, but in more or less thought-tight compartments. Alongside of Euclidean Economics is another large body of ideas, which some writers distinguish as the "art" of political economy, or "applied economics," in spite of the fact that it is chiefly other principles than those of the economic Euclid which are here applied. It may broadly be called "social economics" as distinct from the deductive, static economics of price, exchange value and distribution. Sidgwick's *Art of Political Economy* is a most valuable contribution in this field. John Stuart Mill enters it in his discussions of property and communism, land tenures and the sphere of government, and in his Essay on Liberty. Adam Smith's treatment of public expenditures belongs here, also a large part of J. B. Clark's *Philosophy of Wealth,* Carver's *Essays in Social Justice* and the writings of Veblen and Hobson.

Far removed as these are from each other, something approaching a synthesis may be possible, on two conditions. One is that description and judgment be kept distinct, with the result that descriptive economics may be free to describe what it pleases without the need of adopting a final yardstick with which to measure all the conflicting values it finds. Under these conditions, the values the market measures need not be the sole material of economics, nor price the sole recognized measure. Another condition is that selective generalizations be recognized and used as *tools of analysis,* and means of approach to truth, rather than as embodiments of ultimate and absolute verity. The marginal method, as a tool of analysis, is invaluable; but as the sole source of truth it is woefully inadequate.

The progress of inductive study is in a fair way to give us truly descriptive statements about prices and other tangible economic quantities in purely behavioristic terms. This should have the result of freeing the "laws of price" from dependence on generalities bound up with connotations of approval or disapproval. On these terms, inductive study may be allowed to range farther afield and gather materials for more fruitful generalizations on social economics than have yet been made.

However, we shall never be free from the need to use constructive scientific imagination. We may describe existing institutions, but we cannot know their effects on man without knowing what alternative institutions would be like. Since the experimental method has such limited possibilities in the field of large-scale human organization, creative conjecture will always play a most important part. Even Veblen has descended to it in his book *The Engineers and the Price System,* taking up the burden of visualizing a possible change in the existing order.

As for final valuations, in which we shall decide which human values are most important and which are not worth what they cost, these cannot be set up in advance, for they will evolve endlessly, as more and more light is thrown on the effects of industrialism; showing us what values it furthers and what values it defeats. We used to have a quantitative economics of social efficiency in purely abstract terms. We can still have a quantitative economics which describes objective phenomena, but the economics of efficiency cannot be quantitative in the sense of having a pre-existing measure of quantities. It must form its measure as it goes along.

COMMUNITIES OF ECONOMIC INTEREST AND THE PRICE SYSTEM

by

MORRIS ALBERT COPELAND

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COMMUNITIES OF ECONOMIC INTEREST AND THE PRICE SYSTEM[1]

1. PRICE AND WELFARE

Professor Fisher tells us that compensating the dollar "would directly and indirectly accomplish more social justice and go farther in the solution of our industrial, commercial, and financial problems than almost any other reform proposed in the world today."[2] This seems a far-reaching, almost an extravagant claim. And yet in a society where a pecuniary standard is employed to make the measurements by which the resources and agents of production are apportioned among the several industries and trades and by which the distribution of products and services is determined, any imperfections in that standard would necessarily have very serious consequences for economic welfare and justice. And admittedly our dollar yardstick works quite imperfectly:—there are many wide discrepancies between the price measures that the market puts on things and the costs in human effort and suffering that have been required to make them, or their significance for consumers' welfare; there are many wide discrepancies between the net value in exchange received by a "producer" and his net addition to the serviceability of the product. If somehow we could eliminate these discrepancies, if in this broader sense we could "compensate the dollar," we should indeed work a mighty reform for economic welfare and justice.

Although our present concern is not directly with the problems of social reform, it does have to do with the introduction of corrections into our pecuniary measure which will make it a more satisfactory standard. There are clearly two questions, more or less capable

1 The writer wishes to acknowledge the helpful criticism of Professor H. J. Davenport and Dr. Woolf Cohen of Cornell University. He is also indebted to Professor J. M. Clark, under whose guidance an earlier form of this paper was worked out.

It may be noted that in order to avoid too great a complication of the issues raised, certain concessions of phraseology have been made to the many economists who adhere to a "marginal desirability" psychology. The writer does not subscribe to this theory.

2 Irving Fisher, *Stabilizing the Dollar*, 1920, 112.

of separate consideration:—(1) What are economic justice and common welfare? By what standard shall we measure or otherwise determine the welfare or justice of a given situation? (2) When and insofar as the situation falls short of this standard, how can it be brought to agreement with it? We shall attempt to confine our attention to the first question, and to formulate in pecuniary terms a tentative statement of the direction in which the common economic interest lies.

Impressed by the numerous and far-reaching imperfections of the price measure, many economists have given it up and sought some other standard by which to appraise the current situation. Certain writers have even gone so far as to abandon the problem to other fields of thought. It will be a part of our task in this preliminary sketch (for it makes no claim to finality) to consider some of these views. But in the end we shall return again to pecuniary value, believing that it is worth preserving and improving upon as a standard of welfare and justice, in spite of its many short comings, and that, even if we cannot rely on it exclusively, its advantages are such that where it is applicable we cannot afford to do without it. First of all, however, it will be desirable to make an analysis of the discrepancies in our pecuniary standard, in the hope of tracing these discrepancies to some phase or phases of the present institutional situation, for a knowledge of causes may be of assistance in making accurately—even if only hypothetically—the requisite corrections. What then is the relation between price and welfare in our present society?

2. SOME DISCREPANCIES IN THE PECUNIARY STANDARD

Economists have often looked on the world and seen that it was good. Here was a vast, complicated society composed of highly specialized workers, a net-work of interdependent families and communities without any general manager. There are many functional foremen, of course, managers of particular organizations devoted to some specialized line of production, but no one coördinates all these independent enterprises. "Every individual . . . intends only his own gain." Yet somehow, "the study of his own advantage, naturally, or rather necessarily, leads him to prefer that employment which is most advantageous to the society"; somehow there is coördination of specialists. To Adam Smith it seemed, indeed, that "he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention." If we may make a substitution for the "unseen hand," we may say that certain economic institu-

tions accomplish this leaderless coördination,—exchange, price, and money. Each exchanges what he produces (production being conceived in a physical sense) for money, and then exchanges money for the goods and services of others. The price or rate of exchange is fixed at the point where supply and demand are equal, and competitive bidding insures fair play. Thus, according to the classical view, we have *leaderless exchange coördination* of specialists, and the *common welfare* coincides with the private interests of each individual under conditions of free competition.

Socialists have more frequently looked on the darker side of life and found waste of natural resources, chronic idleness of people and of industrial apparatus; non-living wages, insecurity of workers, wasteful use of their services and inhuman treatment; diversion of human effort into the production of armaments, luxuries, adulterated products and advertizing; ample incomes to non-workers; and autocratic control by a capitalistic minority whose title is hereditary. Some have laid most of these evils to the existence of money and of middlemen, and have been prone to overlook the merits of the present system. Marx, at least, accepted much of the classical view of exchange coördination, including the materialistic conception of production. But he did not accept the imputation of product to the capitalist. In general, value equalled cost of production, but for labor, value greatly exceeded cost of living—here alone was a *produit net,* a surplus value. In appropriating it, the capitalist exploited labor, and to exploitation Marx would trace our economic ills.

The voluminous arguments between the holders of these opposing views have usually convicted no one of a more serious charge than disagreement with his opponents' premises, at least so far as the main outlines of the systems are concerned. The issue between them is, Does one produce who owns active industrial equipment? In some respects the Marxian view is the more realistic, but so long as we accept the classical formulation of the issue, the argument as to which way lies economic welfare and justice must always be a "'Tis" and "'Tain't" affair. Fortunately there has been made possible something of a synthesis, that will assist us in constructing standards of social appraisal.

The broad, general truth of the classical explanation of the coordination of specialists without any general manager, there is no disposition here to call in question. It appeals and persists because of its comparative simplicity as well as its approximate truth. But what is insisted on is that it is only an approximation,—so rough and crude that it fails to account for any of the imperfections of co-

ordination except as deviations from the theoretical norm. Business depressions have been construed as *abnormal* times, trusts as *unnatural* monopolies, non-living wages as true only for the *short-run*, and many *social* evils have been blamed on *individuals* and the inaccuracies of their felicific calculations. More frequently, perhaps, because the "*pure* theory" of exchange did not apply to these cases, they have been left to "*applied* theory."

Many of the necessary corrections in this analysis of leaderless exchange coördination have already been pointed out, but it may be well to recall the chief ones here, especially as their full significance for economic welfare is not yet generally appreciated. Wealth and economic goods have usually been conceived as including scarce, desirable, *material* objects and perhaps human services.[1] Producer's goods, being durable, are thus for the most part regarded as exclusively material.[2] Production, as the creation of wealth or performance of service, is typically industrial—extraction, manufacture, transportation, storage.[3] Marketing is only a special kind of production, in which the functions of the travelling salesman tend to become

[1] These and the following citations in support of the present formulation of doctrine for criticism are not intended to be exhaustive. They are the more explicit commitments to concepts and hypotheses, sometimes tacitly accepted, which give economic theory a bias presently to be pointed out. The logical conclusions which a rigorous adherence to these concepts and hypotheses might require are of course frequently moderated by a common-sense recognition of incompatible facts, but our concern here must be limited to the underlying bias itself.

As examples of writers who define wealth as almost exclusively material, we may cite: L. C. Marshall and L. S. Lyon, *Our Economic Organization*, 1921, 5ff.; F. M. Taylor, *Principles of Economics*, 4th ed., 1916, 1, 25; F. A. Fetter, *Economic Principles*, 1915, 265, 115; Irving Fisher, *Elementary Principles of Economics*, 1912, 3–4; J. B. Clark, *Essentials of Economic Theory*, 1907, 5, 26–7.

The following writers include personal services under the head of wealth:—L. F. Edie, *Principles of the New Economics*, 1922, 175–6; E. R. A. Seligman, *Principles of Economics*, 1905, 9–10; H. R. Seager, *Principles of Economics*, 1913, 52–3; F. W. Taussig, *Principles of Economics*, 1915, Vol. I, especially, 19–20, but see foregoing discussion; Henry Clay, *Economics for the General Reader*, Amer. ed., 1921, chap. XII, secs. 1–2 (Includes personal qualities like technical skill); R. T. Ely, *Outlines of Economics*, 1917 ed., 107–109.

[2] Clay, *op. cit.*, 92; Marshall and Lyon, *op. cit.*, 5; Seager, *op. cit.*, 148 (specifically includes money); J. B. Clark, *op. cit.*, 20ff. But some writers include legal claims against debtors as *individual* capital goods. See below 112, note.

[3] Taylor, *op. cit.*, 57ff., especially comments (b) and (d); Marshall and Lyon, *op. cit.*, chap. II; Ely, *op. cit.*, 116–22 (but value production is distinguished from utility production in the case of a monopoly); J. B. Clark,

confused with those of the delivery boy.[1] Even the business enterpriser is sometimes thought of as primarily a factory superintendent, technologist, and efficiency engineer.[2] But what is exchanged is not physical objects and processes but legal rights, and the measures which are applied by the undertakers of economic activity, are not ultimately measures of weight or bulk but of price.[3] To be accurate we must make, not a productivity analysis but a *profitivity* analysis.

What difference does it make to distinguish "making goods and making money"? And how does it affect the problem of economic welfare? In the first place to put the analysis in technological and physical terms, rather than in legal and pecuniary terms, may give economists the sensation of having an exact science, modelled on Newtonian mechanics, but it eliminates from *value* theory the consideration of the *actual conflicts* and *coincidences* of human *interests* between classes in modern society. Foot-pounds of labor, acres of land, and square feet of factory floor-space require no reference to particular persons or groups. But legal rights do require such reference, and are perpetually in conflict. To own property is not simply "to have and to hold" physically, particularly in the case of

op. cit., 11ff., 79–82; Seligman, *op. cit.*, 278–9; Fetter, *op. cit.*, 120 (Note that "appropriate" seems to mean "take into one's hand" not "get legal title to"; and that the use of "man" in the singular precludes such a meaning as "capture," or "take away from some one else"); T. N. Carver, *Principles of Political Economy*, 1919, 87, 89. But Carver does not offer an accurate and complete description of the present order, for he intends "to point out some of the more direct methods of improvement." Perhaps his book should have been called "Principles of Economic Reform."

But some writers include also "transfer or possession utilities," a concept that seems to imply a comparison of the utility of one man's ownership with that of another, unless it is a mere instance of "place utilities." For example: Seager, *op. cit.*, 122.

[1] Taussig, *op. cit.*, I, 18; A Marshall, *Principles of Economics*, 7th ed., 1916, 63; Marshall and Lyon (*op. cit.*, 145) discuss the middleman's functions as somewhat of this character, but include risk-assumption and finance.

[2] Fetter, *op. cit.*, chap. XXVI, secs. 3, 5, 8; chap. XXVII; Seager, *op. cit.*, 159–160; J. B. Clark, *op. cit.*, 123–4, 153ff., 256ff ("entrepreneur" equals "employer" and excludes "manager.") Risk assumption and merchandizing are, of course, included. On the latter, see below 113, note 3.

[3] T. Veblen, *The Place of Science in Modern Civilization and Other Essays*, 1919, 296ff. The essay from which this citation is taken was first published in 1901. Also his, *The Theory of Business Enterprise*, 1904, 66, 84–5; H. J. Davenport, *Economics of Enterprise*, 1919, 19, 26, 135; W. C. Mitchell, "Making Goods and Making Money," *Mechanical Engineering*, January, 1923, xlv, 4ff.

capital goods. It is to have a bundle of legal rights, rights of alienation, rights to income, rights of business management. Managerial rights may conflict with the contract rights of others—the rights to hire and fire with the right to organize. Or some property rights may conflict with others,—the right to build factories in a residential district with the rights of residence owners. Some of these conflicts are recognized at law; compensation is payable for torts. But in many cases the law does not appreciate the economic significance of the conflicts—there are many *de facto torts*. It should be the task of the economist to investigate the relation of these conflicts of rights and interests to price and exchange.

Moreover, when one confuses making profit with making product, the only ways an enterprise can increase the net return, namely (1) increasing gross revenue and (2) decreasing costs, become identified with (1) increasing output and (2) decreasing the amount of labor, materials, or industrial apparatus required in this or some antecedent process. The prices of these objects and processes are fixed by supply and demand,[1] and all the manager can do on the business (as distinct from the industrial) side is to seek diligently for the best bids or offers.[2] (The only exception allowable to this rule is in the case of monopoly, and too little is said on the score of including such partial monopolies as "good will" in this "abnormal" analysis.) The objective of an enterprise thus becomes to minimize the quantity of labor, materials, land, and plant required to produce a unit of product or service; or to maximize the product given the factors.[3]

[1] It may be noted that this type of theory commonly assumes free competition, which is not "cut-throat." This qualification *necessarily excludes* cases of decreasing unit cost with respect to the size of the firm. The same reasoning which identifies marginal cost and supply price under increasing cost holds here, provided competition is free,—and in particular, free from such partial forms of monopoly as the trade ethics of "follow the leader of the market," and "communities of interest." Under permanent conditions of decreasing unit cost with respect to the size of the firm supply price tends inevitably to equal the increment of total cost required to produce an additional unit,—free competition *must be* cut-throat competition.

[2] For example:—Fetter, *op. cit.*, 332–3, 336–7. (He notes and deplores business connections which lead to "interlocking directorates" and "an evil conspiracy between bad politics and big business." But the sales department is hardly considered in his discussion of business departments and advertising not at all.) Seager, *op. cit.*, 199–200; J. B. Clark, *op. cit.*, 123–4, 153 ff. (See above 109, note 2.)

[3] Thus the law of diminishing returns is often stated so that return means *output* not *income*, suggesting a diminished value in use to the consumer rather

Thus the law of proportion of factors (together with the assumption of free competition) implies the full use of plant and equipment,[1] which necessitates construing depressions as abnormal. But the chief significance of the shift from the pecuniary to the technological reckoning lies in the shift of viewpoints it involves:—Money income to the enterprise is thus confused with physical output of goods and services for consumption as the motive to production, and money outlay by the enterprise with the intake of labor-sacrifice undergone by its employees as an item to be economized. Not only does a productivity analysis make it easy for the theorist to overlook class conflicts, but it even helps him to identify the interests of the tradesman with those of his customers and the interests of the employer with those of his employees.

But there are many exceptions to a materialistic conception of economic goods besides personal services, and to a technological basis for profitivity besides those thus far listed. Property rights attach to other things besides physical objects and processes,[2] to ideas, to bits of technological theory embodied in the objects and processes—rights to employ the idea by manufacture, use, or sale; to names and symbols; to social situations such as good business connections or a high reputation; to incorporeal persons like corporations; to credit; to contracts. And these items of property exchange, at least, as freely as more tangible assets. They do not, however, fit so neatly into the older theory of exchange coördination,

than a decreased (net) value in exchange to the business owners. Cf. A. Marshall, *op. cit.*, Bk. IV, chap. III, sec. 1, Bk. IV, chap. XIII, sec. 2; Clay, *op. cit.*, 330–2 (In terms of increasing cost and supply price per unit of product as well as decreasing product per expenditure); P. H. Wicksteed, *Common Sense of Political Economy*, 1910, especially Bk. II, chap. VI; Ely, *op. cit.*, 388ff; Seager, *op. cit.*, 129; Seligman, *op. cit.*, 212; J. B. Clark, *op. cit.*, 156. A similar suggestion is sometimes strong in the technological statements of the law of comparative costs; e. g., idem, p. 233; Marshall and Lyon, *op. cit.*, 182–4 (Note the confusion between individual enterprise and community.)

1 Cf. Taylor, *op. cit.*, 122ff., where the implication is that normally, given the plant and equipment, "the utilization of those factors must be pushed" at least to the point where unit cost (of those and other *physical* factors) is least. Note the confusion of enterprise and industry, 126–7. Cf. also Seligman, *op. cit.*, 250–1. "Expenses will increase but not so fast as the income . . . Up to the point of full utilization" or decreasing returns. But the confusion between one enterprise and the industry beclouds the issue.

2 H. J. Davenport, *Value and Distribution*, 1908, 152–3; *Economics of Enterprise*, 131; Veblen, *Place of Science*, 362; *Theory of Business Enterprise*, 139.

and certain economists have tried to read them out of the market.[1] By way of explanation it has been urged that these items would be eliminated,[1] if all property were held by a single owner; hence they are not "social" wealth. But this is a curious defense for those who insist that competition and multiple ownership are "normal." For the present purpose it is important to remember in this connection that the bulk of civil law is a set of precedents delimiting the conflicting property and civil rights that enter into exchange. To assume that a formal legal change, such as transference of titles to the state, would eliminate not merely these intangible forms of property but also all the conflicts in the great complex fabric of human interests in our highly specialized society is to join hands with the state socialists. And yet it seems to be just this assumption that has enabled economic theorists to overlook the conflicts of interest that are the essence of modern economic problems and hypothecate for the pure science a pre-established harmony. That it is

[1] A. Marshall, *op. cit.*, 60–61, 76ff. Marshall classifies wealth and capital as individual and social or cosmopolitan. But "By far the most important usage of the term Capital in general, i. e. *from the social point of view*, is in the inquiry how the three agents of production . . . contribute to producing the national income . . . and how that income is *distributed* among the three agents," 78. (Italics are the present writer's). Taussig eliminates all gains by one enterprise at some one else's expense from the class "productive activities" by asking "whether the labor adds to the sum of utilities" (yours being added to mine apparently). *Op. cit.*, chap. II, secs. 3, 4. On capital he applies a cancellation of inter-individual claims to distinguish individual from social. "For the purposes of economic study, we shall disregard the individual's point of view. . . . In speaking of capital we shall have in mind real things, and not the right to things . . . , the community's apparatus of production" (83–84). But how can non-predacious labor and social capital be used to explain actual competitive prices? For Ely, intangibles cancel from the social point of view. But good-will, etc., must be included in a pecuniary estimate even of social wealth, *op. cit.*, 109–111. Some writers discuss only the elimination of inter-individual debts. For this it is only necessary to conceive physical objects to which titles attach as held unencumbered by debt. It is not clear what disposal is to be made of the public debt. Fisher, *op. cit.*, 51ff., especially 56; Fetter, *op. cit.*, 265. (But see 282–3 on intangibles.) Seligman, *op. cit.*, 20.

Comparing the present situation with "natural value" in an imaginary Crusoe or collectivist economy is another way of eliminating intangibles and conflicts of interests from consideration. Cf. Davenport, *Value and Distribution*, 358ff. H G. Brown appears to use this method, *Economic Science and Modern Welfare*, 1923, II, 14–15. He recognizes immaterial and predatory capital (82–83) as things which might be prohibited (167)—minor discrepancies in our organization—but adheres on the whole to a productivity rather than a profitivity analysis.

not merely a materialistic bias that is involved would seem to be attested by the omission from consideration of certain tangible goods as well,—shyster lawyers' libraries, bill boards, adulterated products, etc.

If property rights attach to other things than physical objects and processes, so also pecuniary value attaches to property by virtue of other than technological performance. Making money is broader than making goods,—it includes creating a market as well. One can adapt a man's desires to one's product as well as adapt the product to the man's desires;[1] economic guidance is a part of "value production." Business includes much beside industry. It is important not only to use little and produce much, but to buy cheap and sell dear, especially under conditions of inadequate information, partial monopolies and trade ethics, economic friction in entering into alternative transactions, differences of skill in bargaining and persuasion, differences in ability to wait or to avoid the transaction altogether, in ability to take the matter to court and in the importance of the transaction as a precedent, variability of human tastes, overhead and joint costs. For making profit it is more important to bombard the consumer with an admixture of information and persuasion, establish advantageous business connections, make the most of the worker's weaknesses in bargaining, and hire lawyers to stretch one's legal rights for all they are worth, than to produce efficiently.[2] It is a commonplace that the factors which play the major part in determining the policies of business management are exceptions to the (physical) productivity theory.

Thus far we have seen how the materialistic conception of economic goods and processes has led to an economic theory in which imperfections in the competitive functioning of leaderless exchange coördination are viewed as abnormal.[3] A profitivity theory, as distinguished from such a productivity theory, accounts for coördina-

[1] J. M. Clark, "Economics and Modern Psychology, II", *Journal of Political Economy*, xxvi, 138.

[2] Veblen, *Theory of Business Enterprise*, 24; *The Engineers and the Price System*, 1921, 34ff.

[3] It is significant that the generally recognized exceptions to the purely industrial conception of production suggest no breach in the harmony of specialist interests:—(1) human *services*, (2) risk-assumption, (3) *discovering* the best bids and offers, (4) *locating* buyer and seller for each other and altering the size of units dealt in, (5) specializing on (2) (3) and (4) in the loan market, (6) anticipating market fluctuations and discounting them, etc. Where specific business operations are excluded from "production," description and appraisal become hopelessly confused. Taussig, *op. cit.*, 20ff, 24, 25–6

tion and coincidence of interests insofar as maximizing net profit involves as by-products both turning out goods for consumption and economizing on the materials, equipment, and labor-sacrifice required, and only insofar. It also accounts for conflicts of interests and rights,—for one man's gaining a merely *differential advantage*[1] at some one else's expense. Thus it reconciles the classical conflict between the economist's explanation of leaderless coördination and the socialist's desire to explain economic "illfare." But we have yet to inquire:—Just what sorts of discrepancies in price as a measure of social welfare, as an incentive to and reward for productive services to others, as a distributor of the power to call on others for service, arise from these conflicts of interests? What sort of standard of welfare can we apply to these discrepancies, that will indicate the direction in which a remedy should lie?

It is clear that money, price, and exchange, while they accomplish a rough, approximate coördination of specialists, often lead people not only to profit at the expense of others, but also to get themselves into difficulties. Each, seeking his own greatest gain, helps to bring about a result which was no part of his intention. But that result is not always the common good of the self-seeking parties;[2] it may be a common misfortune,—cut-throat competition, a business depression, a war among the nations of which they are subjects, or waste of the national resources. Because there are imperfections in the pecuniary standard, because making money does not *necessarily* mean making goods nor making goods *always* mean making money, each seeking his own differential pecuniary advantage may help to get himself as well as everyone else into trouble.

If our property and other civil-economic rights were such that each person or organization, in entering or refraining from any

(Also Carver, *op. cit.*, 37ff., 193ff., unless he means to confine his efforts purely to formulating a standard of appraisal.)

For our present purpose it is merely a nominal alteration of a productivity theory to insist on measurement of product in pecuniary terms. "Value productivity rendered" to the consumer is hardly better to confuse with gross revenue or net profit as the item to be distributed or to be maximized with respect to the size of the firm and the proportion of factors than is service rendered. Production and acquisition need to be distinguished.

[1] For the concept of "differential advantage" cf. Veblen, *Place of Science*, 361; *Theory of Business Enterprise*, 126.

[2] Cf. Veblen, *Place of Science*, 292–3; *Theory of Business Enterprise*, 27, 301; Walton H. Hamilton, "The Price System and Social Policy," *Jour. Pol. Econ.* xxvi, 66, 1918; S. and B. Webb, *The Decay of Capitalist Civilization*, 1923, 183; Carver, *op. cit.*, 359.

transaction, had to bear all the costs and could reap all the gains of so doing, we should probably be safe in assuming the coincidence of individual interests and the common welfare. This would imply that each independent fiscal unit, family, business enterprise, state, municipality, etc., could increase the volume of services it received from others only by increasing its money payments to them, could decrease its money payments only by decreasing the burden on them, could increase its money receipts only by increasing the service rendered, and could decrease its service rendered only by suffering a fall in money receipts—save only for lending and borrowing. In other words money—and the commercial banking system—would be performing perfectly the function of keeping score in the great game of getting a living,—the function of a social cost-accounting system.[1] Under such circumstances consumer's demand might shape business policy rather than conversely, and technological efficiency might be the chief task of business management.

But it is obvious that things are far otherwise today. Thus, in spite of the pronouncements of economic theorists, under the present system of civil-economic rights, it pays differentially to make the work go around. Laborers "go slow," and business men are concerned to create as big a market as they can—to get as much business as possible. A "favorable balance of trade" helps to make the work go around, and differentially is advantageous, perhaps to everyone in the country—it helps to start the upward swing of the

[1] To those whose theory has rested on the assumption that this is the current state of affairs (or what comes to the same thing on the confusion of making money with making goods in a physical sense) it has seemed that any government interference with exchange coördination was uneconomical, because it led to an incorrect reckoning of costs and gains and so to discrepancies in our social cost accounting. Thus the Law of Comparative Cost underlies the chief argument for free trade. Doubtless this cost accounting bias has had somewhat to do with the persistence of the Laissez-faire theory, and more recently, through the recognition of discrepancies already present, with its gradual dismemberment, particularly in "applied economics." This cost accounting bias may be taken as one of the strands of more permanent value woven temporarily into the fabric of Laissez-faire.

As instances of fairly explicit commitments on the perfection of functioning of our social cost-accounting institutions we may cite the following. (It is usual to qualify the statement by making it a "tendency," since, with economic friction, it requires time for a dynamic society to attain the points of static equilibrium). J. B. Clark, *op. cit.*, 75–78; Taylor, *op. cit.*, 322, 76, 81; Seligman, *op. cit.*, 34. Cf. also Fisher, *op. cit.*, 73ff. His definition of interaction (production) states that the giver of the benefit is always credited with it and the recipient is debited with it as a cost. It is distinctly a cost-accounting conception.

business cycle. There is more truth in Mercantilism than most economists have been prepared to admit, and hence it survives all their protests. For the proper functioning of exchange coördination in the country it is often important to "keep the dollar circulating at home." The classical refutation of the Mercantilist contentions, more explicitly than the contentions themselves, runs in terms of a long-time trend, and it confuses the common welfare with differential advantage. What is required is an investigation in the light of a differential profitivity theory of the bearing of the Mercantilist contentions on the cyclical deviations from the secular trend.

To recognize such imperfections in the functioning of exchange coördination is to recognize (1) that it pays differentially to do many things that are at best of doubtful advantage to the community and (2) that undertakings in the common interest do not necessarily pay any of the independent fiscal units acting in severalty. Frequently one is in a position to acquire or dispose of legal rights, when their exchange-value or exchange cost *to him* offers a sufficient pecuniary inducement, but when to do so conflicts with the economic interests of others who are unable under our present legal and economic institutions to command appropriate compensation. Or, one's legal rights may offer only an inadequate pecuniary inducement to perform a service for others, because existing law and practice does not enable one to collect from all of those who benefit by it.

But if we are to be able to get any general agreement as to how a case of differential advantage should be handled, we shall have to carry our analysis farther than this. In the first place we must be able to specify the parties whose interests are affected adversely or favorably, but do not affect the decision of the party to whose differential advantage it is to enter or refrain from a particular transaction,—the *party in discretion*. We may designate those whose welfare is involved but not considered as the *non-discretionary parties*. In some cases they may be parties to the transaction which affects them for better or worse, in some cases they may be competing for the transaction, and again they may be only remotely related to the market in which it takes place. Another aspect of differential advantage, which is of importance by virtue of the limits which it imposes on precision, is the kind of interest of the non-discretionary parties affected. The cases which should be capable of a fairly accurate treatment are those in which the money income or outlays of the non-discretionary parties are affected, or perhaps

the market value of their property. But it may be "human cost" or "psychic income" that is involved. The consideration which bears most directly on divergences between differential advantage and the common welfare is that which has to do with the character of the effect on the non-discretionary party. Is it favorable or unfavorable? The most complicated aspect of differential advantage, and perhaps the most important for an accurate analysis of many of our economic problems, is the variability in *shape* and uniformity of the cost items involved. What is meant by variation of cost *shape* may be illustrated by the case of that part of the cost of a product which falls on the manufacturer as an overhead charge but is converted into a direct cost to the purchaser. The conversion may run the other way—from direct to overhead—and we may also include capital-revenue charge conversions. Uniformity of cost is employed in the usual sense, referring to the equality of unit costs of competitors. We have, then, four principal considerations on the basis of which we may attempt a tentative classification of differential advantages:—

A. Relation of non-discretionary party to discretionary party's transaction
  (1) A party to the transaction—vertical relationship
    (a) Buyer
    (b) Seller
  (2) Not a party to the transaction
    (a) Horizontal relationship
      (i) Competitor for the transaction
      (ii) In a complementary line to that of the discretionary party for purposes of this transaction
    (b) Oblique or more remote relationship
B. Kinds of interest of non-discretionary party affected
  (1) Cases involving purely pecuniary interests
  (2) Cases involving "human cost" and "psychic income" as well as pecuniary interests
C. Effect on non-discretionary party's economic welfare
  (1) Favorable—Adds to his income
  (2) Unfavorable—Adds to his costs
D. Variations in the shape and uniformity of costs involved
  (1) No variation in shape or uniformity involved
  (2) Overhead costs to non-discretionary party fall on discretionary party as direct costs, and conversely
  (3) Capital charges to non-discretionary party fall on discretionary party as revenue charges, and conversely
  (4) Non-uniform costs to producers fall on consumers as uniform costs

Any particular differential advantage should fall into some class under each of at least the first three principal heads—A, B, and C. Thus, to take a simple case, what has been called a *de facto tort* would involve:—(A) frequently a remote relationship of the non-discretionary party to the transaction responsible for (C) an unfavorable effect on his economic welfare (B) only his pecuniary interests being affected, and (D) these without variation in shape or uniformity of costs.

With cases where there is a mixture of pecuniary interests with "human cost" and "psychic income," or more strictly cases of non-pecuniary advantages and burdens expressed in pecuniary terms by the necessity for choice and so combined with money gains and money losses, it is not possible to deal very satisfactorily by statistical and accounting methods. If they are less important in their bearing on our economic problems, it is not because of the difficulty of treating them *objectively;* but this combination of circumstances may serve as an excuse for slighting them in a preliminary formulation like the present. Where only pecuniary interests are involved it should be possible not only to identify the non-discretionary parties affected by any transaction that pays (or fails to pay) differentially, but also with proper investigation to state approximately the amount of adverse (or favorable) effect, and to point out what, if any, variations in shape and uniformity of costs have played a part in making the transaction differentially profitable (or unprofitable).

The way in which these differential advantages arise out of the conflicting civil rights that enter into exchange and the miscarriage of pecuniary incidence in certain types of decisions should now be easily followed. The type of differential advantage that has been longest recognized, perhaps in part because it involves no variations of shape, is that of monopoly on one side of a market—it pays differentially to manipulate the price by curtailing output (or intake) so as to add to the total net profit by increasing the gross profit per unit, and the non-discretionary party on the other side of the market foots the bill. Under conditions of uneven and scanty distribution of information and of economic friction, this type is highly pervasive in "partial" and "effective" forms.[1]

But it should be clear that differential profits are to be derived under competitive as well as monopoly conditions. Thus it may pay

[1] For example:—Good will, sites, permanent business and financial connections, exclusive and tying contracts, full line forcing, trade ethics, unstandardization of products combined with branding, interlocking directorates, communities of interest, division of market, etc.

differentially to advertize [1] because there are legal rights in habitual customers and because one can legitimately acquire more of these rights *from his competitors* by advertizing or can keep them from acquiring some of his. Again, it frequently pays differentially, especially for a large business, to employ lawyers to discover how the line can be drawn between its legal rights and the rights of others, so as to fall farthest over upon what might otherwise be the domain of someone else, or to prevent others from legal encroachment on its own preserves. Finally we may take a case where only direct costs affect the profitivity of a transaction to the discretionary party, while the unfavorable effect on the pecuniary interests of the non-discretionary party is due to the fact that his account includes overhead costs as well. When one's overhead is already cared for by regular customers, it may pay differentially to offer goods to a competitor's customers at anything above the additional cost of producing these additional goods. And it may still pay differentially to extend such an offer even after the competitor has retaliated and enticed away a part of one's regular customers by similar tactics, leaving a part of one's own overhead uncompensated. In each case such an offer pays because only a part of the burden falls on the discretionary party,—part falls on the competitor who suffers a larger decrement of revenue than of costs, because some of his costs are overhead and continue without direct relation to output. In a competitive market it pays differentially under conditions of overhead and fixed costs to engage in cut-throat competition, and hence in a variety of discriminatory practices between markets, lines of goods, etc. It is significant in this connection that in a régime of chronic underemployment of persons and plant, overhead costs affect the working of competition in nearly every market.

There can be no presumption, then, either in a competitive or a monopolistic market that making money is a proper norm by which to have productive organizations guided. Differential profitivity is unsuitable as a social policy, but what shall we put in its place?

It is not easy to specify the conditions under which differential advantage could be made to coincide with the common welfare. We cannot get very far by assuming a static society, with *free* competition and constant or increasing costs for each enterprise, for by so doing we rule out nearly all the factors to which imperfections in the functioning of exchange coördination are due. Unless we can

[1] Most advertizing requires a mixture of competition and monopoly. It pays only because it contributes to a partial monopoly. It would not be differentially profitable to trade-mark a standard article under "free competition."

(eventually) get a formula that will take in all these factors we have solved our problem by eliminating it. And if we were to succeed, would we not have prescribed the conditions, possible or only conceptual, that would constitute an ideal society, a utopia? Can we define the ideal situation with which mere differential advantage contrasts, except in terms of the millennium? Must we not conclude with Plato that ideal (economic) justice is to be found only in an ideal society?

Perhaps we shall have to be satisfied with something more tentative and more compromising, but it is clear that we must have some standard other than differential advantage. The very term, differential advantage, implies something with which it is to be contrasted. Before turning to investigate the merits of various theories as to what this contrasting term should be, it will be necessary to consider briefly the claim of this problem to receive the attention of economists.

3. SCIENCE AND WELFARE

With the growth of discrepancies between the classical theory of coincidence of individual interest with the common welfare on the one hand and the practices of the business world following in the wake of the industrial revolution on the other, the necessity for economists to take some stand on the issue has become of increasing importance. Most of those modern economists who are prepared to recognize the full extent of these discrepancies *in their "theory"* and a similar proportion of the much larger group who are not, have followed one of two courses:—Either, disillusioned by the many short-comings of our price measure, they have set up some non-pecuniary standard of social appraisal; or, leaving the job to the ethicist, they have tried to confine their own attention more or less consistently to a purely colorless description of economic processes. It would be impossible in the limits of the present paper to consider adequately the line of division between economics and ethics as it bears on our problem, but it may be worth while to see briefly what some of the issues involved are, before turning to the question of non-pecuniary standards of appraisal.

Historically there is good ground for the position that economists had better leave appraisal alone, or at any rate that they had better leave certain kinds of appraisal alone. The use of such words as "natural" and "normal" has often been attended by results of very doubtful scientific value. When observed facts do not fit one's theory, instead of appraising the theory as untrue or inaccurate and setting to work to get a new theory that shall be a description more closely

approximating the facts, one may keep the old theory and appraise the facts instead—regard them as "abnormal" or "unnatural." Perhaps the chief difficulty with such a procedure is that it is in the nature of the case impossible to tell how far a theory of what normally occurs is to be understood as a statement of what does occur, and how far as a proposal for what should occur. "What is" is inextricably mixed up with "what ought to be."

Traditionally the field of science has been divided into the positive and the normative sciences, and a distinction has been drawn between pure and applied science.[1] The distinctions on which these divisions of the field of knowledge rest are as important today as they ever were; indeed it is probably more important today to separate carefully an impersonal account of what is taking place from a statement of one's private tastes and attitudes toward these occurrences, altho the problem of the social scientists may be peculiarly intricate here. But it is not so clear that the field of science either does or should divide along these traditional lines. One may recognize fully the importance of the distinctions, and still hold that the most efficient division of academic labor requires an apportionment of the field of thought along other lines.

The position of economics in this scheme of things has been anomalous from the start. Economists, with physics as their model of scientific procedure, have often held that economic science should confine itself to an objective description[2] of such processes as production and exchange, that it was rightfully a pure, positive science. According to this view the problem of the common welfare has been relegated to "applied economics" and ethics.[3] Philosophers, on the other hand, have been wont to class economics with ethics, logic, and esthetics,[4] because like them it has to do with evaluation and ap-

[1] J. N. Keynes, *The Scope and Method of Political Economy*, 1891, 34ff., 53ff.

[2] N. S. Senior, *Political Economy*, 4th ed., 1858, 2f.; F. A. Walker, *Political Economy*, 1911, 22–26; J. N. Keynes, *op. cit.*, 46ff; J. L. Laughlin, *Elements of Political Economy*, 1887, 5; H. J. Davenport, *Economics of Enterprise*, 1913, 29; O. F. Boucke, *A Critique of Economics*, 1922, 253ff.

[3] Also to "economic art" and to politics. Senior, *op. cit.*, 2–3; Keynes, *op. cit.*, 53, 55, 72–80; Davenport, *Economics of Enterprise*, 30. Boucke (*op. cit.*, 259) holds that economics may study the conditions under which an ethically approved situation comes about.

[4] W. G. Everett, *Moral Values*, 1918, 8; R. B. Perry, "Economic Value and Moral Value," *Quart. Jour. Econ.* xxx, 445; T. de Laguna, *Introduction to the Science of Æsthetics*, 1914, 8–9; Warner Fite, *An Introductory Study of Ethics*, 1903, 18–19; J. H. Hyslop, *Elements of Ethics*, 1895, 11.

praisal, with human desires, tastes, and preferences. Nor can it be said that economics differs [1] from these others in that it is its task merely to *describe* objectively the desires and preferences of other people, for there are also ethical and esthetic theorists who would take the same position,[2] e. g., they might undertake to trace objectively the cultural evolution of canons of taste and conduct. But the point of chief significance for our present purpose is that this distinction, despite the extent to which it has been relied upon by "anti-welfare" economists, does not and cannot exclude our inquiry from the field of economics. If it is proper to describe other people's interests and preferences objectively, then by the same token it is proper to investigate the relations between them—their coincidences and conflicts of interest and the conditions that give rise to them,—it is even proper to ask how a change of conditions would alter these relationships or what change in conditions an alteration of the coincidences and conflicts would involve.

All this raises another issue which Professor Perry has employed to preserve to ethics certain problems that have traditionally belonged to it and in particular the problem of social welfare and justice, with the economic phases of which we are here concerned. To him it has seemed that the economist should concern himself with the distribution that results from the pursuit by each individual of his own private interest, including thereunder such a prudent regard for the interests of his fellows as is calculated to give him the maximum gain in the long run. The question as to the result of each individual's considering the interests of his fellows on their own account is reserved to the ethicist.[3] Perry thus clearly recognizes that the issue is not between description and appraisal, but between investigation of individual welfare on the one hand and of the common welfare on the other. Apparently he would keep for ethics the investigation of an "inter-subjective" view that embraces the conflicting

[1] For a recent commitment on the distinction between economics and ethics as one between description and appraisal, see G. A. Kleene, *American Economic Review*, xii, *Supp.*, 197; and W. I King, *idem*, 200. (Roundtable Conference on Relation between Economics and Ethics.) Also Boucke, *loc. cit.*

[2] Frank Thilly, *Introduction to Ethics*, 1905, 22; S. E. Mezes, *Ethics Descriptive and Explanatory*, 1901, 6–9; Ernst Grosse, *The Beginnings of Art*, 1900, 8–9; and less certainly T. Lipps, *Grundlegung der Æsthetik*, 1903, 2.

[3] R. B. Perry, *op. cit.*, 483, 485. Perry has good economic precedent for this general position. Cf. W. S. Jevons, *Theory of Political Economy*, 1911, 27; and F. Y. Edgeworth, *Mathematical Psychics*, 1881, 6, 15.

interests of competing individuals. The precise line is not clear, but its tendency is to make of economics an individual and of ethics a social science, for otherwise it would be open to the economist to concern himself with any and all the relations between the (economic) interests of different individuals, actual and possible.

Perhaps Perry and those whom he typifies are the more ready to reserve to ethics such questions as, "What sorts of railroad rates protect the interests of the investors and at the same time those of the several shippers, without neglecting the interests of any of them?" or "What policies are in the common interest in dealing with the business cycle?"; because they are not institutionalists. At any rate he does not ask, "Are these conflicts of individual interest due to the perversity of human nature or are they to a considerable extent the result of human institutions?"; he appears to assume the former alternative as a matter of course.[1] To one who prefers the other view the problems of the common economic welfare become, not questions adapted to the tastes and training of the closet-philosopher, whose view, however broad, is wanting in contact with the present economic institutions and classes involved; but problems which only a trained economist is competent to undertake. According to this view the investigation of the common welfare is allotted to economics because, with the existing logical inter-relationships of problems, only so can there be an efficient division of academic labor.[2] Even Professor Perry does not prohibit this sphere to the economist; he merely asks that he shall approach it not as a mere economist but shall bear in mind some of the broader ethical issues involved,—surely not an unreasonable request. On the other question as to whether this inquiry is a part of value theory ("pure economic science") little need be said. It both is a theory in the sense of an attempt at generalization and has to do with value in exchange or price.

Assuming that the investigation of the conflicts and coincidences of interests of different individuals is quite as scientific an undertaking as the study of the interests of any single individual, and that the economist is best equipped to investigate the common economic interest, one further question arises. To state objectively that the common interest is thus and so, should be precisely like any other impersonal description, commanding acceptance because it is a consistent and accurate generalization, or arousing disagreement because it is inaccurate or inconsistent. But the matter does not necessarily

1 Perry, *op. cit.*, 447, 476–85.

2 Cf. H. Gordon Hayes, *Amer. Econ. Rev.* xii, *Supp.*, 194–5., (Roundtable Conference on Relation between Economics and Ethics.)

end there. Many of us incline, as a matter of taste, to lend our approval and support to such a course as the common interest is stated to require. In this, perhaps, we overstep the bounds of science, for it is not logic that requires us to take this step. In taking it we are not so much stepping out of economics and into ethics, as stepping according to an ethical rather than a logical canon of conduct. It is a moral *act* rather than the theorizing of a moralist. In what follows we shall attempt to confine ourselves to objective statements as to which way the common interest lies, leaving anyone free who so desires to take this further step for himself. And yet this mere description, like every scientific inquiry, betrays an appraisal in that it is undertaken in preference to some other inquiry. In this case the significance of investigating conditions of harmony of interests is that it yields us standards of comparison, standards to which many of us as non-scientists lend our approval. In this sense they are standards of appraisal.

4. SOME STANDARDS CONSIDERED

Most of those who have been deeply impressed with the defects of the pecuniary standard as a measure of an individual's contribution to the welfare of his fellows or of theirs to his welfare, have felt it necessary to abandon the pecuniary standard altogether and set up some other measure of economic welfare. Professor Fetter has even gone so far as to advocate classifying economic theories as either "price economics" or "welfare economics."[1] It is unfortunate that these non-pecuniary standards of welfare have seldom been fully and accurately described. Too often they have been in the nature of unformulated or partially formulated assumptions. It is difficult, therefore, to do justice to those who hold them.

It will be convenient for purposes of our discussion to consider examples of three principal types of theories,—(1) physical or technological theories, (2) human and psychological theories, and (3) socio-organic and group-personality theories. Perhaps because their views are recalcitrant to classification in the categories of another outlook, perhaps because they are genuinely of a dual nature, certain writers find their way into more than one group.

The first group of theories are alike in that they designate as in the common interest certain technological or physical magnitudes which stand in contradistinction to pecuniary magnitudes, or that they attempt to exclude as contrary to the common interest certain

[1] F. A. Fetter, "Price Economics Versus Welfare Economics," *Amer. Econ. Rev.*, x, especially 467.

pecuniary magnitudes which have no direct technological or physical significance. The more purely technological theories are seldom given explicit formulation, but it is often urged, particularly by socialist writers, that industry should be run to turn out products and services rather than to turn out profits,[1] thus implying a technological standard of appraisal. So long as different physical quantities of the same product are in question, we may with some assurance assume that they measure different degrees of subservience to the common interest. But, as soon as it becomes necessary to compare one product with another or with the raw materials, hours of labor, and so forth, consumed in its manufacture, any purely technological theory breaks down. We must have some common measure, some standard of comparison. Under such circumstances there are but two alternatives. One will be discussed presently under the third group of theories,—we may shift from heterogeneous physical magnitudes to some sort of "collective utility" as the common measure. The other involves the setting up of some set of exchange relationships between the different commodities, services, and so forth, with, presumably, some one as a "standard of value." In other words the theory thereby ceases to be a substitution of technological for pecuniary magnitudes and becomes one of correcting the price measure, of substituting one set of pecuniary magnitudes for another.

The more explicit and tenable technological theories recognize this difficulty and undertake to correct the actual pecuniary measures by eliminating income claims which have no technological or physical basis. Insofar as the normative aspects of a productivity theory can be separated from its descriptive aspects its confusion of productivity with profitivity may be said to make of normal price a correction of the existing pecuniary measure by a technological standard. A more clear-cut form of this position appears to underlie Veblen's distinction between pecuniary and industrial employments,—the purely pecuniary or acquisitive activities of business men are not, like the industrial activities of engineers, foremen, and manual laborers, readily construed as subservient to the common interests,[2] for the latter directly increase the physical volume of product, while the

[1] C. Delisle Burns, *Government and Industry*, 1921, 81–2, 285; S. and B. Webb, *The Decay of Capitalist Civilization*, 1923, xvi f., 187; R. H. Tawney, *The Sickness of an Acquisitive Society*, 1920, 13ff.; G. D. H. Cole, *Social Theory*, 1920, 57–8; H. W. Laidler, *Socialism in Thought and Action*, 1920, 38; H. G. Wells, *New Worlds for Old*, 1908, chap. V. The term service is ambiguously a physical and a psychological magnitude in many of these citations.

[2] T. Veblen, *Place of Science*, 285ff., 293ff.

manipulations of the former serve only to acquire a larger share of the claims upon it. Another version of the distinction, more explicit on some points of present moment, appears in Davenport's theory of primary and secondary distributions. The primary claims to distributive shares are held by virtue of human labor and supervisory activity and the ownership of instrumental goods and loaned funds. The secondary distributive shares are due "to bad institutions of property rights and inheritance, to bad taxation, to class privileges, to stock exchange manipulation, political favor, legislative and administrative corruption . . . and every sort of vested right in iniquity."[1] "Technological value-productivity" is contrasted with the "value-productivity" of good will, high finance, etc., and with claims not derived from enterprise—inheritance, indirect effects of taxation, etc. But the line between "a distribution by right of productive contribution" and one by some other right is not too easily drawn, for even the primary distribution "takes place" under "political and property institutions." The productive contribution of those who "live by owning" is sufficiently less obvious than the productive contribution of those who live by the sweat of their brow to leave ample room for dispute.[2]

Nor is this the only defect of the distinction for our purposes. It is doubtless true that most of our industrial processes are advantageous to the consuming public, and it may even be that no purely acquisitive act can be construed as in the common interest. But, clearly there are some acts generally supposed to be in the common interest which no more directly increase the physical volume of product than acquisition; and as truly affect its distribution. Such are legislation, and administration and interpretation of laws, at least insofar as they are not regarded as a part of the administration and direction of industry. So also adapting a man's desires to a product

[1] H. J. Davenport, *Value and Distribution*, 560. Neither Veblen nor Davenport has in view the precise purpose to which their distinctions are here put. Veblen is concerned with a classification of occupations that typify the present cultural situation. Davenport certainly does not label his "primary distribution" as a standard of appraisal. Unfortunately he does not distinguish too clearly between the physical sense in which "production precedes and conditions and limits consumption" and the legal sense in which "the production-distribution process logically [?] precedes . . . other distribution influences." Davenport's distinction has also been put into psychological terms, a formulation which is perhaps more accurate for his purposes.

[2] This objection cannot be raised against Veblen's statement, which touches only occupations. And Davenport distinguishes between productivity of property and deserts of proprietorship, *Economics of Enterprise*, 154ff.

rather than the product to his desires may in some cases be held, if not in subservience to his desires, at least for what is commonly held to be his welfare in a hygienic, intellectual, or moral sense by altering and educating his desires or choosing for him in questions where he is not competent to speak for himself.[1] If these do not fall in the acquisitive class, at least they are outside of the technological. And on the other hand some physical products are definitely out of accord with the common interest[2]—poison gas, anarchist dynamite, impure foods, etc.

We may conclude, then, that technological magnitudes have the advantage of being easily and objectively ascertainable, and so, where it is only a question of the magnitude of a single item, like barrels of flour, they may be very useful. Furthermore, to employ them may be a good, quick way to unmask the intricacies of pecuniary and legal relationships, and to get at least a suggestion as to how the land lies. But the distinction between acquisitive and technological will be differently construed by people of differing class prejudices and is only roughly coincident with what we are seeking as a measure of business policy. It succeeds better in specifying policies which are dictated by purely differential advantage, than in offering a constructive standard of appraisal.

The human or psychological theories have in common that they measure welfare in terms of some biological or psychological trait of man. Hobson has given perhaps the most complete recent formulation of this type of theory,[3] tracing in some detail the discrepancies between the pecuniary costs of production and the human costs and gains that the productive process entails on the one hand and between the pecuniary value of the product and the human gains and costs to which its consumption gives rise on the other. Hobson recognizes that the principal discrepancies are not those between the different human costs and gains and their pecuniary expression where *only one* person is involved, but rather between the human costs and gains for several different persons and the pecuniary estimates put upon them. It is, therefore, necessary to find some standard which will enable us to express A's desires and preferences and B's desires and preferences in common units. To do this we may resort to a "price-

[1] Cf. J. M. Clark, "Economics of Modern Psychology II," *Jour. Pol. Econ.*, xxvi. 138 (tripartite theory of production.)

[2] Commented on in another connection by Davenport, *Economics of Enterprise*, 126–7; Veblen, *Place of Science*, 357. The other type of exception would doubtless be admitted also.

[3] J. A. Hobson, *Work and Wealth*, 1914.

system," or what comes to about the same thing, assign various weights, dispersions and skewnesses to the desires of the several persons. Or, as in the case of technological theories, we may shift to a socio-organic position, in which each man's interests are interests of the "collective personality." Hobson does both. In following the first method he criticizes the weights that price assigns today, and also the "every-man-to-count-as-one" theory and suggests that human cost of production varies inversely with worker's ability, while human gain from consumption varies directly with needs.[1] But since his corrections are expressed in "psychological" magnitudes, it is difficult[2] if not impossible to determine how large or how small the pecuniary corrections should be. Indeed, except in cases generally approved or generally condemned, it can be only a matter of opinion or taste whether to make the sign plus or minus.

A version, intermediate between the psychological and socio-organic types of theory, runs in terms of instincts. They are presumed to be the traits of individuals, but because their ground of survival can be understood in terms of the race as a unit, a judicious use of the concept of instinct-expression may make it possible to solve the difficulty of inter-individual conflicts. The use of instincts as a standard of socio-economic appraisal is suggested by several writers.[3] But no two are agreed as to what instincts man possesses, still less as to what constitutes expression and what "balking"; and some hold a view of instincts which offers little basis for appraisal.[4] Here too, then, we find that the psychological theories, however attractive in the abstract, are hopelessly ambiguous when it comes to any concrete application on which there is not already general agreement, and are lacking in the objectivity and definiteness to which science aspires. It may be that in some cases economists have no alternative but to attempt corrections of the pecuniary standard

[1] *Op. cit.*, 163ff.

[2] Admitted, 165. But Hobson holds this no excuse for not trying,—his method.

[3] Carleton H. Parker, "Motives in Economic Life," *Amer. Econ. Rev.*, Supp. viii, 219–31. Ordway Tead, *Instincts in Industry*, 1918, ix, 220. And very guardedly, Veblen, *Instinct of Workmanship*, 1914, 24–25. L. F. Edie, *Principles of the New Economics*, 53–4, 67–8. "Adaptation involves an equilibrium between expression and repression of the instinctive tendencies." That is, human nature and institutions must be adapted to each other.

[4] Cf. J. Watson, *Psychology from the Standpoint of a Behaviorist*, 1919, 268; J. R. Kantor, "A Functional Interpretation of Human Instincts," *Psychological Review*, xxvii, 52.

by estimating human costs and human gains; but in general it should hardly be their first resort.

Both in the case of the technological and in that of the psychological theories we found it possible to meet the need for an inter-commodity and inter-individual standard by resort to some sort of a group-personality, who should embrace within himself all desires for all goods and all dislikes for tasks and sacrifices, and somehow settle all their conflicts. This is the third type of theory in one of its extremer forms. The common point of all such socio-organic theories is that they regard certain groups of people as units, each unit bearing a greater or less resemblance to a living organism and that some of these resemblances give a basis of appraisal with respect to the group regarded as a unit. For those who do not hesitate to personify the group this basis is that the group personality has interests like the rest of us. The bearing of any development or situation upon the common welfare may be appraised in terms of its subservience to those interests.

But fortunately we do not have to choose between such a view and a complete denial of similarity on the part of any group of people to a single organism. The question is one of degree. We may attempt to specify a minimum limit of the organic character of a social group which we shall designate as "pecuniary society."[1] In this group are included all parties currently and recurrently to exchange in any market throughout the world, and also the dependents of these parties. The following resemblances between pecuniary society and a typical metazoan organism may be listed:—(1) Pecuniary society is a complex of more or less highly differentiated and specialized individuals, while a metazoan organism is a complex of differentiated cells. The individuals like the cells of the organism are dependent on each other for the continuance of their specialized life. (2) The group has certain characteristics and behaves in certain ways in a large measure independently of the constituent individuals involved, just as a metazoan may replace worn-out tissue and regenerate, within limits, its parts and still maintain its identity structurally and functionally. Pecuniary society goes through an industrial revolution and forward peoples exploit backward peoples without much reference to the rise of any single person to financial power or the death of any

[1] A somewhat moderate and precise formulation is made by B. M. Anderson, *Social Value*, 1911, 83ff. Anderson, however, denies that social value in his sense throws any light on social welfare (196); but if only economic welfare is in question it is not clear why. To the present writer he seems to go too far in his animism and anthropomorphism, and to overlook important dissimilarities.

financier. (3) Certain sub-groups, or certain institutions (to analyze pecuniary society along somewhat different lines) can with as much propriety as bodily organs be construed as having special functions. And when we admit this resemblance we have it open to us, following the lead of the pathologist, to ask "Does this group or this institution perform its function properly? And if not, how does it come to function as it does?" Thus a socio-organic view becomes the basis of appraisal.[1] We are at present, indeed, investigating just these questions in regard to the functions of money, price, and exchange,—coördination, apportionment, and distribution.

It may be the part of caution to set down here, by way of contrast, three of the distinguishing features of a biological organism which pecuniary society and (except possibly for part of the second) every other social group clearly lacks:—(1) definiteness of size, and of structure or of location of parts (2) reproduction of like organisms at roughly regular intervals of a generation, and death as the end of a fairly definite life-cycle and (3) contiguity of organic parts. With less confidence we may add that the cells, tissues, and organs of a metazoan—particularly of a human—organism do not prey upon and conflict with each other in their functioning in a manner fairly analogous to the conflict and predation among individuals and groups that characterize society,—the functioning of the parts of society displays less perfect coördination than is to be found in the individual organism, unless perhaps we wish to compare society to a pathological specimen.[2]

To some it has seemed that by analyzing pecuniary society logically into the behavior of its constituent individuals they might somehow do away with pecuniary society.[3] But surely logical analysis does not

[1] Cf. L. S. Lyon, "A Functional Approach to Social-Economic Data," *Journal Pol. Econ.*, xxviii, 563. But Lyon inclines to anthropomorphize.

[2] This may be taken in lieu of the customary statement, "In an organism consciousness is concentrated in a small part of the aggregate, while in society consciousness is diffused." This involves needless commitment on a current psychological issue. The significant question is rather, Is the behavior of society so highly coördinated as to warrant our thinking of it as purposive, reasonable, consistent, sympathetic, truthful, righteous, loyal, or otherwise to conceive of it anthropomorphically?

[3] To the present writer this appears to be Davenport's position, not so much in any explicit statement as in his system viewed as a whole. He does not much concern himself with synthesizing the simultaneous functioning of competing entrepreneurs into the behavior of pecuniary society. He will not study the whole play because he insists on taking the rôle of one actor at a time, and on taking that part only in its pure form bereft of content,—only insofar

necessarily invalidate the concept analyzed; nor does it destroy the thing conceived. Having made the analysis, it still remains to see how the activities of the constituent individuals articulate in the functioning of pecuniary society so, for example, as to produce the rhythmical movement of the business cycle. And this would seem to be the job of an economic price theorist.

But how far ought we to go in the direction of endowing pecuniary society with the traits of a living organism or with those of that very special case, man? Has pecuniary society a mind? Has it interests, desires, preferences? If not, will the sort of appraisal that the concept "function" permits suffice to arbitrate between the conflicting interests of individuals? Hobson, at any rate, is among those who do not hesitate to go the whole way.[1] And on the hypothesis of a group personality, whose interests are versatile enough to embrace the interests of all men, the investigation of the settlement of conflicts of individual interest becomes a study in volitional "social" psychology. The economist is likely to make this into a social felicific calculus, taking place perhaps in the social subconscious.[2]

A somewhat similar effect is obtained by employing the situation in a "collective society" as the antithesis to what pays differentially today. Thus for Davenport, money as a record of and incentive to individual performance and as a claim against the social product is absent.[3] And he has the *society* (personified?) "making comparison . . . according to considerations of utility—marginal utility, of a vague and average sort."[4] His concept of a competitive economy logically implies such a régime. And yet, what has one whose "business is solely with the facts" to do with imagining a society so impossible as this collectivism? It is by no means clear that a society with labor as minutely divided as it is today could avoid exchange and price. And if it could, why study only the behavior of individuals in the one case and only the behavior of society (or its leader?) in the other? Why not espouse the "group mind" theory (or the heroistic interpretation of social process) in both cases or in neither? Are not separate individuals, each having his own interests

as it is like every other part. If so, as Anderson has remarked, Davenport's extreme individualistic position differs from the more moderate views of many economists chiefly in its greater consistency.

1 *Op. cit.*, 350.

2 *Cf.* Anderson, *op. cit.*, 85.

3 *Economics of Enterprise*, 31. Collective economics avowedly throws no light on competitive economic welfare.

4 "Value and Distribution," 144; and "group-marginal utility," 146; and yet he inveighs against the social organism.

and choosing accordingly, with their several interests and preferences in greater or less conflict, characteristic of any society?

But it would seem the part of caution, where pecuniary society obviously differs in many respects not only from man but from any living organism, not to employ animistic or anthropomorphic categories except where careful examination shows that they imply no incorrect assumption of resemblance. We shall do well to avoid speaking of "the interests or the welfare of society." Thus far we have used "the common interest" as being a term of fairly neutral cast. Hereafter we shall refer to a "community of interests" and never "the interests of a community." And the problem of the common welfare becomes one of harmony and coincidence of individual interests, of individual welfares. It will be our task to investigate what lines between the legal and effective rights of separate individuals give rise to conflicts and what to communities of interests.

The objection to socio-anthropomorphism in its extremer forms is not merely on the ground of accuracy. Interests and preferences cannot readily be assigned to the group personality on the basis of any *objective* criterion capable of inducing agreement among different economists; or at any rate, if such a criterion is found, then that and not the group personality is the essential point of the theory for our purposes. But more likely the tastes and preferences assigned will depend, so far as they are given concreteness, on the class and other preconceptions of the particular economist. Like the individual psychology theories, the group *personality* theories are chiefly useful in cases already settled.

But we have seen that the more guarded and presumably more accurate formulation of the socio-organic view allows of at least two types of scientific, economic investigation, which have to do with setting up standards of comparison and appraisal for the structure and functioning of a social group as a unit:—(1) To speak of the function of this institution or that group raises the question, "To what extent does it perform the function?" In dealing with this question the ideal performance of the function becomes the standard by which the actual performance (or lack of it) may be appraised. (2) We may study the conditions which give rise to communities and conflicts of individual interests. Thus a hypothetical community of interests among a group of people becomes the standard with which the actual conflict of interests among the group under present institutions may be compared. To these we may now add a third:—(3) A community of interests is a particular sort of articulation of heterogeneous interests—each seeks "his own gain" which is pre-

sumably a different result from what every other seeks, at least in the persons affected. But there also may be groups, the members of which have certain identical interests, tastes, or ideals,—certain notions of what things ought or ought not to be done by or to happen to a person. These ideals may offer us still another standard of comparison for what actually occurs. Where an event or condition is generally condemned, we may measure the extent of present deviation from the ideal by such tangible statistical items as the number of industrial accidents, windowless tenement rooms, etc. None of these three lines of inquiry requires us to personify pecuniary society or even to make of it a social organism, and only in the first does the economist himself venture overtly to appraise.

5. A REVISION OF THE PECUNIARY STANDARD

So much for non-pecuniary standards of appraisal. But do the many short-comings of price require us to abandon it altogether as a method of stating where common interests lie? Or may we not somehow doctor the pecuniary measure, "compensate the dollar," and so use price to compare with price and to specify the direction of a harmony of interest? If we may, the pecuniary measure has certain obvious advantages:—It is a definite affair, capable of statistical and accounting treatment. It is sufficiently objective so that different observers should expect to get comparable results. Since price plays a central part in the incentives to economic performance and in the apportionment of men and the non-human factors among the several lines, to state a community of interests in pecuniary terms should throw a considerable light on the methods by which such a community might be achieved.

Many indications point towards a pecuniary standard. Price is continually becoming a more predominant factor in our lives as specialization proceeds and more of the phases of our household economy move out into the world of business. Some standard is desirable which will relate the variegated interests of a host of separate individuals, and apparently that means some sort of price-system. Both the technological and the psychological theories led either to a group personality or to some pecuniary theory. So also the classical value theory has set up a pecuniary norm with which the observed prices might be compared—what would occur under free competition. But if we are to set up a pecuniary standard, it must differ in at least two important respects from the classical normal value:—(1) As has already been intimated, it must make no pretense of being in some subtle sense an "explanation" of actual

prices, precisely because it is a *standard* with which to *compare* them. Our present concern is strictly and solely with the standard. (2) The pecuniary results of present competition are not acceptable as indicating the direction in which a community of interests may lie, and in some cases at least, this appears to be due, not so much to lack of perfect freedom as to the presence of competition under present legal rights:—waste of natural resources like oil, cut-throat competition, business depressions, competitive armaments (insofar as competition induces producers to "develop" the state as a market and insofar as they are successful), child labor, bad working conditions, seasonal industry, etc. Enough has already been said to throw grave doubt on the accuracy of the assumption that each seeking his own gain under free competition tends to promote the common welfare. We shall, therefore, attempt to formulate a standard which shall be independent of the short-comings of both monopoly and competition.

The general character of the standard required has already been hinted at in the discussion of differential advantage. Given two or more persons, each acting independently in pursuit of his own differential advantage, under what circumstances might we find a community of interests among them? And why look for our community of interests among this particular group of two or more? The characteristic which led us to designate any personal gain as a *differential advantage*, was that in some respect the costs fell differently on the discretionary party (or the gains accrued to him differently) from their incidence upon others. In other words, to refer to a gain as a differential advantage is to point out some particular *discrepancy* in the way in which money functions to keep the cost records of pecuniary society. And when we attempted to analyze differential advantage, we found that we could specify not only the discretionary party, but also the non-discretionary parties whose interests were directly involved, but whose gains and losses from the transaction in question were inaccurately reflected in the accounts of the party in discretion. Here, then, we have the group whose interests require to be integrated—in theory—into a community.

The outline of this process of pecuniary integration should now be clear. *Given* certain discretionary parties to whom, differentially, a certain course of action is a paying proposition, and *given* the non-discretionary parties and the effects of the course of action on their interests; what alterations would there be in costs and gains accruing from this action to the discretionary parties, if all the costs fall-

ing on non-discretionary parties could be passed on to the discretionary parties in the same "shape" and if all of the gains could similarly be passed on—including, if possible, items representing human costs and psychic income? And, reckoning in these further items attributable to the course of action in question, does it pay *integrally?* Or, if not, what course of action does the *integral advantage of the discretionary parties* dictate? This integral advantage should, if properly defined, be in harmony with the interests of the non-discretionary parties; and so together they constitute what has been called a community of economic interests,—barring, of course, other differentials than the one just considered involving several of the same parties.

It may be easier to see just what is involved in this process of integration if we employ it separately on some of the special types of differential advantage.

In cases of horizontal and oblique relationships of the non-discretionary parties to the transaction in question we may frequently neglect any variations in the shape and uniformity of costs involved, and confine our attention to the effect on the non-discretionary parties' welfare,—Is it favorable or unfavorable? And how large is it? The relation between differential and integral advantage[1] here is comparatively simple. By way of illustration we may take

[1] Professor Pigou draws a distinction between the "marginal social net product and the marginal trade net product" which is based practically on the ground of favorableness and size alone. A. C. Pigou, *Economics of Welfare*, 1920, chap. VI. His most important illustrations are badly-drawn farm-tenancy contracts and advertising. It seems unfortunate that the concept of "social net product" (if not the concept "trade net product" as well) embraces much of the confusion already discussed between income and output, between value in use to the consumer and value in exchange to the tradesman. Perhaps this explains why his consideration of the subject is so closely confined to chapter VI. Carver distinguishes between destructive, deceptive, persuasive, and productive methods of struggling for existence, *op. cit.* 37, and contrasts neutral and harmful, uneconomic ways of getting wealth with economical ways, 192ff. But by dint of a selective description of the "productive" and "economical" aspects of our present society he manages to arrive at a somewhat complacent view of a society which the incautious reader is likely to confuse with our own. A more genuine attempt to follow out the implications of such a distinction is made by H. C. Adams, in his "Relation of the State to Industrial Action," *Publications of the American Economic Association, 1st Series, Vol. 1*, No. 6, 1887, 21–22. Adams contrasts production with speculation, and absolute interest with relative (=differential) interest. Perhaps the only thorough attempt to follow such a distinction through a whole system of economic theory is Davenport's competitive (as contrasted with his collective) economics.

a case where the pecuniary effect is unfavorable, what we have called a *de facto tort*. Integration here is only a question of adding the pecuniary costs inflicted on the non-discretionary parties to the costs which already fall on the discretionary party in case he decides to follow the course of action he has under consideration. In such a case it may well result that it would not pay him integrally to do what is differentially to his advantage. The case where the pecuniary effect is favorable to the non-discretionary parties is to be treated similarly. Here the additional money gains attributable to the undertaking of the discretionary party may make that undertaking pay integrally when differentially it is not worth while. Theoretically the problem need not be altered when the effect on the non-discretionary party is no longer on money income or outgo or on the market value of property, but is rather an advantage or disadvantage because of the particular interests and preferences of the party involved—a part of his "human costs" or "psychic income." But practically it is difficult to make such an integration, because of the vagueness and uncertainty of the pecuniary measures for these "psychic magnitudes."

Cases which involve differences in the shape and uniformity of the items are more complicated. These are usually characterized by a vertical relationship between the two sorts of parties—both are parties to the transaction, but not equally in discretion. There are several differences in the shape and uniformity of pecuniary items at different stages in the backward flow of income that accompanies the forward flow of goods, of which a theory of differential and integral profitivity must take account:—

(1) Professor Clark has called attention to the importance, in this connection, of conversions between direct and overhead cost items and has worked out their integration in some detail.[1] It may suffice here to consider briefly the special case where an overhead cost item at one stage in the channel of trade is converted to a direct cost item in the next succeeding stage. To the seller certain costs of rendering the service are overhead, continuing whether the then volume of service is rendered or whether the volume is somewhat more or less. To the buyer these costs are direct, this being the custom in sales contracts. Under these circumstances it may pay him *differentially*, if business is not very good, to stop buying and thereby avoid entirely for the time the pecuniary burden of this service. But this burden is not thereby stopped for the seller,

[1] J. M. Clark, "Some Social Aspects of Overhead Costs," *Amer. Econ. Rev.*, xiii, *Supp.*, 50–9.

and if we are to integrate the pecuniary interests involved into a community we shall have to assume some alteration of the institutional situation that will make these costs overhead to the buyer as well as to the seller. Then it might pay the buyer *integrally* to keep on buying, because he could save very little by stopping. Certain interesting complications in the overhead cost analysis are raised by cases where the buyers considerably outnumber the sellers, but their consideration would unduly prolong a preliminary sketch like the present.

(2) Another difference of pecuniary shape is that between capital and revenue items, between investment costs and costs of doing current business. At one stage in a channel of trade the costs of a particular item of technological performance may be chargeable and the revenue derived therefrom creditable to the year's profit and loss account. But at the next stage these items may be chargeable to capital assets. The building contractor derives income, but the corresponding outgo is permanent investment, not current expense. Decisions to make or withdraw investments are made purely on the grounds of their pecuniary virtues or vices as paying investments, not at all with regard to their effects on the incomes of those who produce these producers' goods purchased for investment. Hence it may pay differentially to invest or to withdraw investment when integral advantage would dictate another course. Curiously, when we come to integrate this case, it turns out to be a special instance of the previous one, for a pooling of accounts would require us to make the contractor's profit and loss account an analysis of the cost of building account. Revenue debits and credits are converted to capital debits and credits, not conversely. And if the accounts of all producers of capital goods are thus integrated with those of their purchasers, the decisions of the purchasers will still be made on investment grounds. *But* all the investment costs were previously directly attributable to particular investments,—investment costs, that could be avoided by avoiding those investments. Integrally, however, the overhead of the producers of capital goods cannot be avoided by the investor-purchasers. They now have to carry these costs anyway.

In order, then, to find a differential advantage due to this change of shape as such, we should have to find contractors deciding on grounds of income and expense what *integrally* is a question of investment cost and ownership. But on this question contractors are not the chief discretionary parties. It would seem, therefore, that this shift of form from capital to revenue items does not give

rise to any differential advantage on its own account. It is important, in the case we have just considered, as a combining element. So, also, it is of considerable consequence in differentials such as typical cases of corporate manipulation and high finance, cases where one man's capital is juggled to become another man's income.[1] But these are *de facto torts,* requiring only addition in order to specify the integral advantage,—the losses to stockholders are to be added to the expenses of "finance" in the individual accounts of the financier. Because of these interrelations, if not on its own account, the capital-revenue conversion of form requires attention.

(3) Beside these two variations in the shape of the cost items, we must list those frequent cases of variation in their uniformity where a number of enterprises or persons produce the same good or service at different costs per unit, but sell it in the same market at the same price. Under these circumstances the infra-marginal producer commands a differential income, sometimes at the expense of the consumer, sometimes in part at least at the expense of the higher-cost enterprises or persons. A number of factors are involved in the allocation of the burden as between purchaser and high-cost competitor: the market price, the terms of the sale contract, the conditions that give rise to non-uniform costs, etc. It is a nice problem in pecuniary incidence, to which considerable attention has been given. We shall, therefore, content ourselves with having listed it here.

Before proceeding to a more detailed illustration of the relation between differential and integral pecuniary advantage, it may be well to present certain qualifications of the integration process. In the first place, integration is not a mere pooling of pecuniary interests. It does imply pooling in a certain sense. A gain for one party should represent a clear addition to the gains of the group as a whole, and should never be at the expense of some other party to the integration. Furthermore the "shape" of costs and other items should be uniform throughout, the standard of shape being that which would result from a consolidation of the accounts. But integration does not imply any loss of the lines of demarcation between the several parties. Unlike pooling, each party still seeks independently to maximize his own private gains, reckoning the costs and yields *to himself.* Integration does not mean combination of several independent fiscal units into a single independent fiscal

[1] Cf. Veblen, *The Place of Science,* 375–378; *Theory of Business Enterprise,* 151–174.

unit. It means only that the pecuniary situation is so altered that the alternatives open to one of these fiscal units require it to carry all the costs it imposes on the other parties, without any change of shape, and allow it to realize all their gains which are attributable to its action. It is a community or harmonization of individual pecuniary interests, rather than a consolidation into a single discretionary and accounting unit that obliterates the individuality of the constituent parties.

In this connection it may be well to recall that our investigation of the group personality theories led us to confine the use of such terms as "interest" and "advantage" to individuals, avoiding such socio-anthropomorphic conceptions as "the interests of a group." When some or all the pecuniary interests of several persons are added together—the incomes pooled—at some stage of the distributive process, we may perhaps be pardoned for allowing the phrase, "the interests of the group," as an abbreviation for "the sum of the (pecuniary) interests of the members of the group." But we should never lose sight of the reference of interests or advantages to *individuals*. Hence, in formulating a term to contrast with differential advantage it seems desirable that it should be just as precise in its reference of advantage to individuals as the given differential allows, that it should preserve intact each of the independent fiscal and accounting units with which we start. In some cases, as we shall see, it may even be necessary to break up a given pool or combination of interests into its constituent parts because the pooling has brought about a very imperfect integration, because some of the parts can gain differentially at the expense of others. But even here it will still be true that integral advantage always means advantage to the same discretionary party as that whose differential advantage is under investigation,—whether this be an individual, or less accurately a group, whose advantages are pooled, whose incomes are summed.

Yet the analogy to consolidation and pooling may be pushed farther if one cares to do so. So viewed, the independent fiscal unit, participating in a community of interests, becomes a managerial and cost accounting unit in a larger organization, whose limits tend to spread and become coextensive with those of pecuniary society. So viewed, too, the economist appears as something of a social cost accountant [1] when he studies the conflicts and harmonies of pecuniary interest, and points out places where costs are not borne or gains realized by those responsible for them, or describes the alterations

[1] J. M. Clark, *Amer. Econ. Rev.*, xiii, *Supp.*, 50.

in the pecuniary situation which would bring about a more accurate allocation of costs and gains according to responsibility. Indeed, the whole present conception of differential and integral advantage is an elaboration of the cost accounting "mores" that each should pay in full for all he gets, according to its cost of production, and should be fully paid for all that others get from him.

It requires perhaps to be pointed out again that a statement of what integral advantage is, is only a statement of a standard with which the existing (differential) situation may be compared. It is in no sense a remedy or a method of reform to be applied to the situation, although this formulation of the standard, this statement of the direction in which a community of interest lies, may condition the choice of methods (by those concerned with problems of method). The course by which such a community of pecuniary interests may be achieved, may be a change of titles, or of the property rights attaching to certain titles, special taxation, new contract forms, a more centralized control of separate enterprises and trades, or any of a variety of other remedies. Our present concern is not with these ways and means, but only to specify wherein a community of interests consists, only to formulate an ideal standard of comparison.

One further qualification seems called for. Integral advantage is admittedly, only a proximate standard. It always has specific reference to some contrasting differential advantage. The community of interests in which it finds a place is necessarily a limited community, falling short of embracing all the interests of pecuniary society. Any community of interests, were it to be actually achieved, would involve readjustments and alterations ramifying throughout the entire fabric of the system of prices, to say nothing of the accompanying technological changes. Under these circumstances it is impossible, even if we were to perform all our integrations at once, to regard the result as one all-inclusive community of interests, for that result would necessarily be built upon such derivatives of current differential advantage as the present distribution of income. We shall have, therefore, to be content with the more proximate standards of specific integrals, admitting that these integrals may turn out to be differentials with respect to some larger group. We can claim only that certain differential advantages *have been* integrated, subjecting others, as rapidly as they appear to the same treatment. As already intimated, complete integration is possible only in an ideal society, and could throw little light on immediate economic problems, if we attained it.

As a corollary of this specific reference of integral advantage we may note that the theory is limited in its applicability by the nature of the available data. Because a statement in terms of integral profitivity is a more accurate formulation of the nature of communities of economic interest than one in terms of productivity under free competition, it necessarily requires a more complete and specific observational basis. While statistics at present available should be adequate in many—perhaps in most—important cases for a rough determination as to whether present conditions are in accord with the integral advantages of the parties concerned, a precise application of the theory must wait upon accounting publicity and uniformity. Without such information there can be no accurate ground for holding either that the status quo does or that it does not give rise to a harmonious coincidence of pecuniary interests. Except on the basis of reliable statistics such an objective social appraisal of the functioning of exchange coördination as that here contemplated is impossible. Economic condemnation, and likewise and to the same extent economic approval, are otherwise very nearly certain to be mere matters of private taste and prejudice. Accuracy and objectivity require an observational basis.

By way of summary it may be advantageous to compare the present position with that of Davenport. According to the latter view, our competitive economy is contrasted with a collective economy. Conflicts and divergences of interest appear to be due chiefly to multiple ownership and discretion, to the fact that each may choose for himself. According to the former, multiple legal rights are well-nigh inevitable under modern technology and multiple discretion is the essence of any social group, but drawing legal or pecuniary lines differently may transform conflicts of interest into communities, and the contrast is between these two, both competitive and both in pecuniary terms—between a situation giving rise to differential and one giving rise to integral advantage. Unlike the Davenportian position, such a contrast is alway specific, indicating the non-discretionary parties whose interests are affected and the pecuniary alterations in the institutional situation which would change the differential into an integral advantage, that carried all its own costs in their original shape and reaped all its own gains. Being institutional, it finds competition and legal rights vastly more flexible, and since only minor differences in these institutions are involved in the contrast, the actual and the hypothetical situations are enough alike so that one may shed considerable light upon the other.

By way of making the theory of differential and integral pecuniary

advantage more concrete, and of insuring that the relation shall be clear between the generalized formulation of the contrast of the common welfare with private special interests on the one hand and certain more specific contrasts—some of them commonplace and widely accepted—on the other, we may now set forth in bare outline a few important applications of the theory. Properly these illustrations should make the effort to specify the pecuniary magnitudes involved, where adequate information is available, since such a specification is an essential part of our contention; but the attempt would inevitably raise questions of statistical technique that would carry the discussion far beyond the appointed limits of the present paper.

I. *Technological improvements* and certain related developments present a number of contrasts between differential and integral advantage. Differentially it has often paid to introduce a new technological process because a large part of the costs fell on somebody else,—the costs of depreciation through obsolescence. Pigou calls regarding this as a case of differential advantage a "specious fallacy," advancing as his reason that curious classicism, "Whatever loss the old producers suffer through a reduction in the price of their products is balanced by the gain which the reduction confers upon the purchasers of these products."[1] But that hardly meets the point that one man suffers damages that another may gain; or that the technological change often involves, on the integral reckoning, an *increase* in the interest, depreciation, and maintenance charges in connection with the investment in new equipment that *exceeds* the saving in operating costs,—a net integral loss. Knauth's reasoning[2] would seem more agreeable to the present view. Indeed, he draws almost precisely the present distinction between what pays differentially, disregarding the annual costs which someone else has contracted for a few years in advance in order to be equipped to operate the old process, and what pays integrally, when one carries all the costs involved. In order to make an accurate estimate of the net integral profit or loss on such a transaction, it would seem neces-

[1] *Op. cit.*, 164. Pigou feels that, in a case where depreciation of workers' skill would turn the (integral) balance against immediate technological change, the necessity of waiting until the generation of mechanics has been depleted by death clinches the argument. But he apparently forgets that someone somewhere, if not the consumer or the innovating entrepreneur, is obligated to provide some sort of maintenance for those deprived of a large part of their earning power.

[2] O. W. Knauth, "Competition and Capital," *Political Science Quarterly*, xxx; 579–582.

sary to have access to the books of enterprises in the industry, but a rough estimate could doubtless often be made with the generally available information.

Two analogies may be suggested from the status of the laborer: (1) One type of cost which has not, until recently, fallen on the employer in its true form, is that of depreciation through senescence. Differentially it has paid him to lay off old employees without provision for further maintenance, and in the extreme, to overwork them to a premature old age. (2) The differential profitivity of importing immigrants in part derives from the fact that employers do not have to carry the depreciation of earning power of those with a higher standard of living.

But differential advantage is not always on the side of technological change. Standardization and interchangeability of parts among the products of competing and complementary enterprises might well enable them to supply the most utility to the consumer at the lowest cost. Integrally, therefore (including in the community these enterprises and the customer), it should pay each enterprise so to act that this result would be brought about. But, differentially, such an innovation not only does not pay, but it is even profitable to invent needless diversity so as to market duplicate parts that fit only one brand of apparatus and so help make the work go around. The combined integral loss involved in such a situation should be measured approximately by the additional costs of producing these unnecessary duplicates, less whatever increased costs are involved in producing standardized products. Integrally, too (including the coal industry and its consumers in the community), it would seem a very wasteful technology that carries raw bituminous coal to hundreds of thousands of small consumers, lets them burn valuable by-products in amateur fires and pollute the air, and carries the ashes away again. Integrally it should pay to refine the coal, save the by-products, carry the energy by wire as electric current, or by pipe line as gas or benzol, or perhaps by rail or truck as artificial anthracite.[1] Differentially such a technological revolution does not appeal strongly to any single enterprise in the coal industry because no single enterprise could undertake it. Nor is it likely in the immediate future to appeal differentially to the investment banker, the ownership of the industry being so minutely divided, and the legal restraints on combination and integration being what they are. An attempt to estimate the amount

[1] Cf. C. A. Gilbert and J. E. Pogue, *America's Power Resources*, 1921, 62–63, 80–82, 201–3, 236ff., and on divergence of differential and integral advantage under present property rights 54ff.

of the total integral loss annually incurred under the present technology has been made by Gilbert and Pogue.[1]

II. *Rhythmical unemployment* of persons and industrial apparatus is of two chief types,—seasonal and business-cyclical. We shall consider only those cases of seasonal unemployment where the effect of the seasons is not so direct as to be nearly inevitable. Here, and in the case of cyclical unemployment, there is a clear difference between what pays differentially and what pays integrally. Differentially each enterprise may count the interest on its investment as overhead, continuing regardless of operation or shut-down. So also it may reckon depreciation and some maintenance, salaries of most managers, and so forth. But practically all of wages, materials, and supplies will be direct, avoidable costs. Differentially, therefore, there is a considerable difference between the cost of full-time operation and part-time operation or complete shut-down. And if the season is dull or prices low, or if the market is dull or likely to be so owing to an unfavorable turn of the business cycle, it will pay differentially in most cases to lay off employees and stop buying, entirely or in part. But in a period of industrial crisis this is what many other firms are doing, and as unemployment increases consumers have less to spend. Thus it pays differentially in dull markets so to act that markets will be duller—no single firm can afford to do otherwise.[2] But integrally, Professor Clark finds that the direct costs of full operation with respect to the business cycle are almost nothing,[3] since nearly all of wages (as covering the cost of living) as well as interest on property investment, are overhead. Hence only a nominal revenue should be sufficient to make full operation pay. Much the same would appear to be true of seasonal industries in trades like clothing and coal.

Another curious discrepancy between differential and integral profitivity in connection with the business cycle appears in the fluctuating activity of those trades which produce relatively durable goods, notably the construction industries. Integrally considered (including in our community of interests (1) the enterprises in these trades, (2) those in others to which their employees or equipment might be transferred, and (3) the customers of both) it would seem that these trades might serve as levelers of the industrial load. Since the prod-

[1] *Op. cit.*, 66–7.

[2] Cf. discussion by Walter W. Stewart, "Controlling Business Cycles," *Amer. Econ. Rev.*, xii, *Supp.*, 41.

[3] J. M. Clark, "Some Social Aspects of Overhead Costs," *Amer. Econ. Rev.*, xiii, *Supp.*, 56.

uct is durable, the need for continuous production is less pressing. In boom times, with a general shortage of men and equipment, with building costs soaring like the rest, it should pay integrally for investors in plant and so forth, *considered as a unit,* to postpone further construction and release the employees and equipment as far as possible for more immediately pressing tasks. Then, when times are dull and unemployment rife, when construction costs are at their lowest, it should pay them integrally to build for the future. But differentially it pays to do exactly the reverse,—the flattest industries in time of depression are usually those connected with construction, and the busiest ones when the boom is on are these same producers of durable goods. Differentially it pays to withdraw investment during depression by deferring maintenance and depleting inventories, and to increase investment during prosperity by making up back maintenance, stocking up, and purchasing new plant and equipment. In part this differential advantage derives from the combined direct-overhead and capital-revenue conversion already discussed. In part also it derives from the shifting identity and uncertain commercial status of small separate enterprises. Differentially, it may not pay a firm to build in off-peak times, because it is too near bankruptcy or because it is not yet organized. And again, differential advantage is a matter of estimating the future, and estimates have often been made with inadequate information and understanding of the business cycle.[1]

A well-worn illustration from the business cycle is afforded by the old banking system, under which it paid each bank differentially to call in its deposits with other banks in a financial crisis, in order to increase its own cash reserve *at the expense of some other bank's reserve.* Assuming it succeeded, it would have gained nothing integrally, unless the new distribution of reserves *happened* to be more in accord with the requirements of the financial situation,—a gain which is difficult to measure in pecuniary terms.

III. *Our natural resources* are held under property rights which give rise to important discrepancies between differential and integral profitivity. Integrally, it would pay only as many owners of

[1] It would be an interesting and somewhat complicated statistical problem to attempt an estimate of the amount of combined integral loss which such a differential policy has entailed in connection, say, with new factory buildings in the decade before the war. It is much easier, of course, to estimate the total integral loss due to a business depression as a whole. Cf. National Bureau of Economic Research estimate for 1921, *News Bulletin,* no. 5, May 1, 1923.

bituminous coal lands to open mines as could in the present market maintain fairly uninterrupted operation. Differentially, it pays not only to provide the extra capacity required by bad seasonal or cyclical load factors, but also to add a very considerable excess above the requirements of the peak load.[1] The direct results of excess capacity are cut-throat competition, fluctuating prices, and part-time operation. The indirect results include the necessity for cutting (differential) overhead and investment costs to a minimum, and so discourage the hiring of competent foremen and technologists and the adoption of machinery and methods involving a large original outlay like the long wall system.[2] Again, cut-throat prices and poor technology encourage incomplete extraction; and the pillar and stall method enhances risks. Once differential advantage has led to over-development, the complications continue indefinitely. To estimate the combined integral loss to which over-development gives rise would be indeed a baffling problem.

With petroleum the case is far worse. Integrally it would seem that one well should be enough to sink into one prospect, at least until oil is struck. Not so, differentially. Under existing property rights it may pay the owner best to lease his property in quarter-sections to competing prospectors.[3] Nor can one prospector afford to await the findings of a competitor,—the first to tap the common source gets

[1] e. g. Differentially, it may pay (1) to open mines to-day rather than to-morrow, when the *immediate* trend of coal prices is not so rapidly upward as to make to-morrow's discounted return equal to to-day's return at face value; (2) for a railroad or industrial consumer to open mines of its own, thus throwing the independent mine-owner out of his customary market; (3) to open mines in a non-union district; (4) to open mines in expectation of a market not realized, a possibility whose importance is accentuated by the growth of the mine for years after its original development by the opening of new entries; (5) to open new mines in competition with old, deep, high cost mines especially under the stimulus of changes in transportation facilities, discovery of deposits, etc.; (6) to increase rated capacity in order to get a larger share of car allotments when cars are scarce. In all these cases the differentials are complicated by those overhead costs which fall on mine operators as direct costs. Cf. F. G. Tryon, "Irregular Operation of the Bituminous Coal Industry," *Amer. Econ. Rev.*, xi, *Supp.*, 60–3; C. E. Lesher, "An Introductory Survey of the Bituminous Coal Industry," *Amer. Econ. Rev.*, xi, *Supp.*, 51; F. A. Walker, "Causes of Trusts and Some Remedies for Them," *American Economic Association Publications*, III Series, Vol. XI, no. 1, 294–6. Referred to by Tryon. Walker has the early history of anthracite especially in mind.

[2] H. Archbald, *The Four-Hour Day in Coal*, 1922, 36–7, 47, 114, 116, 131; "Bituminous Coal Industry—Discussion," *American Economic Review*, XI, Supp., 120–1.

[3] J. E. Pogue, *Economics of Petroleum*, 1921, 31–34, 343–5.

the lion's share of the oil.[1] The cost of sinking these unnecessary wells would give some idea of the total integral loss involved, though it takes no account of the accompanying wasteful and incomplete extraction of petroleum.

In the case of forests there are yet other complications. Only a part of the costs of deforestation fall on the forest-owner. As a consequence of his decision the neighboring territory may have a regular water supply replaced by spring floods and fall droughts, and fertile farm lands may be wasted away in spring mud. Estimates of damages from such *de facto torts* would probably vary widely, but there is no question that their total annual amount for the country has often been a large item.

With water-power the case is reversed. Mineral deposits stand nearly still awaiting exploitation, but the energy of a waterfall is constantly wasting away. Yet differentially it does not pay under divided ownership to develop our hydraulic energy resources to anything like the full, without the assistance of special legislation. Thus riparian rights to drainage of property upstream interfere with necessary storage for evening the flow, and their owner can (acting differentially) exact monopoly tribute, unless the power-development project can exercise the right of eminent domain. In the larger streams there are also complications of navigation rights and often of sovereign jurisdiction.

IV. *The incentive problem* in business organization illustrates another aspect of the theory. Differential advantage is not always a matter of relations between separate business enterprises. And, if integration is not a mere pooling but preserves the identity of the separate parties, it may sometimes be required to disentangle the parties to a pool or a consolidation. In a sense we may think of the several departments or branches of an enterprise as elements of a consolidated whole. And the question arises,—What are the incentives of department managers? or What does it pay each differentially to do or neglect? How widely does a manager's differential advantage diverge from what would pay him integrally, from what would pay him if he could gain only by adding to the company's profits and if any increase in profits for which he was responsible was reflected in a loss to him? To answer this question the enterprise must be split up into separate cost-accounting units, according to managerial responsibility, and records kept of individual managerial pecuniary performance. The question is then,—How accurately does his pay vary with his value to the enterprise? The

[1] J. E. Pogue, *Economics of Petroleum*, 1921, 31–34, 343–5.

Law of Size of Firm has usually contemplated profits as the type of incentive payment and one such accounting unit per firm. The gradual development of separate cost accounting units within each firm and of managerial and other bonus-systems now in process offers interesting possibilities for the significance of this law. In combination with the competition for place and promotion, we may find here something that may some day be designated intra-corporate competitive profits.

6. CONCLUSION

In a specialized and interdependent society as complex as our own it is little wonder that there are many far-reaching conflicts of interest,—little wonder that pecuniary values, resting, as they do, upon an elaborate code of legal precedents entrusted to the keeping of a specialized cult, should fail frequently to check exactly with one another, owing to the difficulty in so intricate a situation of tracing the responsibility for each cost and gain, and should in failing give rise to differential advantages to one man at the expense of another—differential advantages that pervade and distort the whole fabric of the price-system. The wonder is, indeed, that communities of interest should be as many and as inclusive as they are; and yet economists, impressed by that great community of specialized servants of their fellows who are also generalized consumers of their fellows' services—"the great coöperation"—have too often left no place *in their "theory"* for anything but harmony. So pervasive, indeed, are these differential advantages and so inextricably are their various distortions intertwined that when one attempts to introduce corrections into the process of social cost accounting which money, price, and exchange perform, he is compelled to confine himself to a single, somewhat narrowly defined, community of interest. Integral advantage stands always in contrast to some particular differential advantage, having reference to the same party to whose discretion the differential advantage makes appeal, and being, like it, stated in pecuniary terms. It differs from differential advantage in that the discretionary party counts all the costs and all the gains without change of shape, which his action imposes on the pecuniary interests of others. But, being thus a resultant of more accurate social cost accounting, its definiteness of reference and of pecuniary statement make it a peculiarly significant form of specifying the direction in which a community of interests lies.

It is not intended to suggest that all communities of interests can thus definitely be formulated. As we have seen, in cases where the

effect on non-discretionary parties is in terms of real cost or psychic income, a definite statement of integral advantage can not be made with any great assurance. And these are but the borderland of cases that the economist is likely to slight, cases in which pecuniary value does not enter at all. We may, quite properly, look forward with Professor Cooley to a progressive assimilation of these non-pecuniary realms of human appraisal by price.[1] And as rapidly as this "progress in pecuniary values" takes place, they will be brought within the scope of our analysis. But the limits of the analysis are not less real nor less important because they happen to be changing.

Nor should it be thought an implication of the present position that conflicts of pecuniary interest can ever be completely and permanently eliminated, either in theory or in fact. In a changing society such as ours, established legal rights and precedents are perpetually getting out of adjustment with technology and social organization; new conflicts of interests arise as rapidly as older conflicts are eliminated. Conflicts are the inevitable accompaniment of institutional evolution.

It is not expected that the statement of integral pecuniary advantage should be the only standard of comparison employed even by the economist, or the only method of expressing divergences of the actual situation from the common interest. It may be desirable to make other revisions of the pecuniary standard, such as estimates of the effect on prices of more adequate market information more evenly distributed. In certain cases, statistics in physical units may be very useful, as already indicated,—man-days of unemployment, calories of wasted fuel-energy, and so forth. And so the technological processes underlying a confusion of differential pecuniary gains and interlocking legal claims may prove a handy short-cut to the integration analysis. Again, the mores and conventional codes of welfare—including the opinion typical of specialized groups, such as physicians—may well supplement the pecuniary standard. Statistics of industrial accidents stand fairly on their own merits. And it may well be that the economist will find it worth his while to investigate communities of non-pecuniary interests.[2] Finally, we may list the notion of function which has recently gained currency in economic thought, and which, though open to grave abuses, should prove a valuable way of conceiving the behavior of groups and institutions.

To one who is willing to follow the statement of integral pecuniary

1 C. H. Cooley, *Social Process*, New York, 1918, 320, 326.

2 An important illustration of such a problem, lying on the border-line of economics, is afforded by competitive armaments.

advantage as a formulation of the direction in which a harmony of interests lies, it may very well seem an easy step to lend his approval to such a situation as is thus depicted and to offer his support for any proposal that promises to bring it about. But the acceptance of this pecuniary formulation of an ideal tends to condition the method employed in its realization,—it suggests that the method of social reform employed, whatever other features it may embody, should be in the nature of an attempt to preserve and improve upon the various pecuniary incentives which now function imperfectly in exchange coördination. Property rights, contract forms, social organization, and so forth, should be altered so as to make individual gain more closely reflect service rendered. In so proceeding we should preserve a fundamental teaching of laissez-faire,—reliance on the pursuit of one's private pecuniary gain as an incentive to the performance of service to others. In proportion as the integrations attempted were realized in practice, it would come to be more nearly true of everyone that "the study of his own advantage . . . leads him to prefer that employment which is most advantageous to the society," or more strictly, most advantageous to his fellows.

THE REALITY OF NON-COMMERCIAL INCENTIVES IN ECONOMIC LIFE

by

PAUL H. DOUGLAS

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THE REALITY OF NON-COMMERCIAL INCENTIVES IN ECONOMIC LIFE

I. THE MINIMIZATION OF NON-COMMERCIAL MOTIVES

Writing in 1836, Nassau William Senior stated[1] that the first of "the four general propositions" upon which the science of political economy rested was "that every man desires to obtain additional wealth with as little sacrifice as possible." This proposition, which Senior apologized for discussing because of its obviousness, he declared to be "the corner stone of the doctrine of wages and profits and generally speaking of exchange. In short it is in Political Economy what gravitation is in physics, the ultimate fact beyond which reasoning cannot go and of which almost every other proposition is merely an illustration."[2]

In enunciating this primary proposition, Senior did not, as Cliffe-Leslie[3] and Knies[4] have assumed in attacking the assumption of the "economic man," declare that men desired wealth for its own sake. On the contrary, he forestalled such criticism as they later advanced by admitting[5] that men's "wants are as various as the differences in individual character. Some may wish for power, others for distinction, and others for leisure; some require bodily and others mental amusement; some are anxious to produce important advantage to the public; and there are few, perhaps none, who if it could be done by a wish, would not benefit their acquaintances and friends." Money however "seems to be the only object for which the desire is universal. And it is so, because money is abstract wealth. Its possessor may satisfy at will his ambition, or vanity, or indolence, his public spirit or his private benevolence, may multiply the means of obtaining bodily pleasure—or the still more expensive amusements of the mind. Any one of these pursuits would exhaust the largest fortune within the limits of individual acquisition, and as all men would engage in some of them and many in all, the desire for wealth

1 Senior, *Political Economy*, 26.

2 *Ibid.*, 28.

3 T. E. Cliffe-Leslie, *Essays in Political Economy*, 163–170.

4 Knies, *Die Politische Oekönomie von geschichtlichen Standpunkte*, 503.

5 Senior, *op. cit.*, 27.

must be insatiable, though the modes in which different individuals would employ it are infinitely diversified."

In other words, while men desire wealth for different purposes, ranging from material enjoyment to lofty altruism, their desires can only be satisfied by the expenditure of money. In the business of making a living, therefore, man's behavior is determined by a logical and all-powerful purpose, "to obtain additional wealth with as little sacrifice as possible." In the field of economic life the economic man is a reality.

Analyzed more closely, it will be seen that at the base of this assumption, is the belief that the only satisfactions of life are those which money can buy; and that he who has more money can satisfy correspondingly more desires. Work, or the process of earning a living, on the other hand, is regarded as a sacrifice and as a necessary evil which one must engage in only as a disagreeable means towards securing an enjoyable end. No allowance is made for the possibilty that some of the desires specified by Senior, as well as others not mentioned, may be satisfied either in whole or in part by the process of the work itself, or by recognition given by others to the worker in other than monetary forms.

Yet down to the present the assumptions of Senior, have, with some qualifications, been followed both by the great body of orthodox economists and by their Marxian critics. The latter have insisted even more vigorously than Senior himself that man is governed solely by pecuniary motives. The marginalists have made this implicit assumption in all their thinking and have worked out elaborate curves of utility and dis-utility. J. N. Keynes in his *Scope and Method of Political Economy,* while admitting that there may be other incentives to effort, nevertheless defends[1] this "abstraction by which men are supposed to act with a view to their own material advantage and the advantage of those immediately dependent upon them." He declares that both because "the desire for wealth is in its immediate economic effects the same, whatever its ulterior object may be," and "in order to introduce the simplicity that is requisite in a scientifically exact treatment of the subject, it is legitimate and even indispensable to begin by tracing the result of this motive under the supposition that it operates without check." By such means,[2] "we may at any rate in certain departments of inquiry, determine the more constant and

[1] J. N. Keynes, *The Scope and Method of Political Economy,* 118–119. (First edition.)

[2] *Ibid.,* 118.

permanent tendencies in operation and here reach a first approximation towards the truth."

Little objection can perhaps legitimately be offered to such a method, if those who employ it are aware of the limited character of their conclusions. Error creeps in, however, when the economist forgets that the result is only "a first approximation towards the truth," and that other ignored forces may invalidate it. Any such conclusions therefore cannot be used as an exclusive basis for determining private or public policy.

If economic science is however to analyze reality, it cannot continue to take cognizance only of this one set of motives; it must attempt to determine what other motives, if any, there are in man, and the degree to which they do, or might, find expression.

We need imperatively to know more about the relative prevalence and strength of man's desire to do a workmanlike and efficient piece of work; of his ability to sacrifice for a principle, an institution, or a person; and of his craving for recognition by others. It is a serious count against the dominant neo-classical school that they have either denied or minimized the existence of such motives, or have brushed them aside with the statement that, for the sake of "simplicity," any consideration of them may be excluded.[1]

Veblen's *Instinct of Workmanship,* Hobson's *Work and Wealth,* and *Incentives in the New Industrial Order,* Taussig's *Inventors and Money-Makers* and Dickinson's *Economic Motives* attempt to take cognizance of these ignored factors. Much of their reasoning is marred, however, by excessive theorizing upon scanty biological and psychological evidence. If we are to lay a sound basis for generalization we must seek to amass far more concrete evidence than has been accumulated in the past, and the proper source of this material is primarily not the psychological laboratory where conditions are simplified and artificial, but in the lives of men and women in the work-shop and the market-place. William James' epoch-making *Varieties of Religious Experience,* which helped to turn religious writings from the sterility of *a priori* theorizing to the richness of men's actual religious experience, may serve both as an inspiration and a guide to the economist seeking light upon the motives of men.

That there are difficulties in thus attempting to appraise motives is evident. Biographical material upon such crucial matters is not only scanty but frequently biassed or stereotyped. Moreover, the whole trend of our society is, on the whole, to emphasize the acquisi-

[1] A noteworthy exception to this, is, of course, Professor Taussig.

tive qualities; money is necessary, not only for survival, but for power, and, in large part, for public respect as well. The motives of working for the sake of the work, for altruism, or for non-financial recognition, find themselves swimming against the swift-flowing stream of financial pressure. If, therefore, they manifest themselves in tangible forms even here, it is certain that in societies that were organized to promote such qualities, they would appear oftener and more powerfully. This essay aims to study the incentives of men of three different types, namely: scientists, business men, and wage-earners, with the hope that the case material furnished will afford a basis from which more adequate generalizations may be drawn.

II. THE MOTIVES OF SCIENTISTS

1. Michael Faraday. Among scientists, few have had a more powerful influence upon industry than Michael Faraday.[1] His researches and discoveries in the field of electro-magnetism have made possible all the manifold applications of electrical power; it is indeed not too much to say that modern industry has been largely transformed by his work. Yet Faraday seems not to have cared in the slightest for money. As a book-binder's apprentice, his interest in science was stimulated by the lectures of Humphrey Davy, and after petitioning the latter, he was accepted as his assistant in 1812. A letter of Faraday's, written some years later, explains the reasons for this step. "When I was a book-sellers apprentice," he says,[2] "I was very fond of experiment and very adverse to trade. My desire to escape from trade which I thought vicious and selfish and to enter into the service of science, which I imagined made its pursuers amiable and liberal, induced me at last to take the bold and simple step of writing to Sir H. Davy, expressing my wishes." By 1830, Faraday, who was by now married, had obtained a high scientific position. His annual salary from the Royal Institution, however, amounted only to one hundred pounds, two rooms, and coals. In 1830, he made a number of commercial analyses which netted him over a thousand pounds more, and in 1831, earned still more. Then as he later told Tyndall[3] "he was forced definitely to ask himself and

[1] There are a number of good lives of Faraday. Bence-Jones, *Life and Letters of Faraday*, 2 vols., is the most complete. Tyndall's *Faraday as a Discoverer* is a charming and sympathetic account by an eminent fellow-physicist, who was his successor at the Royal Institution. Gladstone's, *Michael Faraday* and Sylvanus P. Thompson's *Michael Faraday, His Life and Work* are also excellent.

[2] Bence-Jones, *Life and Letters of Faraday*, I, 47.

[3] Tyndall, *Huxley as a Discoverer*, 188.

finally decided whether he should make science or wealth the pursuit of his life." Because of his recently announced discoveries in electromagnetism, as Tyndall says[1] "he had only to will it to raise in 1832 his professional business income to five thousand pounds a year. Indeed this is a wholly insufficient estimate of what he might, with ease, have realized annually during the last thirty years of his life." Instead he chose science with its £100 stipend from the Royal Institution, its two rooms, and coal eked out by a £200 lectureship at the Woolwich Royal Artillery Academy.[2] Faraday's business income fell in consequence to £155 in 1832 and, according to Tyndall who examined his accounts, decreased[3] "to £92 in 1837, and to zero in 1838. Between 1839 and 1845, it never except in one instance, exceeded £22; being for the most part much under this. From the end of 1845 to the day of his death (1867) Faraday's annual professional business income was exactly zero. Taking the duration of his life into account, this son of a blacksmith and apprentice to a book-binder, had to decide between a fortune of £150,000 on the one side and science on the other. He chose the latter and died a poor man."

Although this income from the Royal Institution was later increased by an annual stipend of £200 from the Light House Service for his services as scientific adviser, and by a yearly pension of £300 a year,[4] as well as other small sums, Faraday and his wife continued to live in their rooms at the Royal Institution and probably gave away at least half of their income. It was part of the faith of the Sandemanians, an obscure sect modeled upon the early Christian Church and similar in many respects to the Quakers, of which both Faraday and his wife were devoted members, that "the Lord would provide"; therefore they never saved. He was equally ungrudging in the time which he devoted to personal kindnesses and would frequently sit up all night with poor and sick members of his faith. Nor was he solicitous of public honors. He declined an offer of knighthood[5] and in writing to Lord Wrottesley, President of the Royal Society, in reply to a query as to what the government might do to stimulate science, he said[6] "without thinking of the effect it might have upon distinguished men of science, or, upon the minds

[1] Tyndall, *op. cit.*, 189.

[2] See also Thompson, *Michael Faraday*, 49, 66–67.

[3] Tyndall, *op. cit.*, 190.

[4] Faraday was also adviser to the Admiralty, but he never drew the £200 attached to the position.

[5] J. H. Gladstone, *Michael Faraday*, 113.

[6] *Ibid.*, 112.

of those who, stimulated to exertion, might become distinguished, I do think the government should *for its own sake* honour the men who do honour and service to the country. I refer now to honours only, not to beneficial rewards; of such honours I think there are none. Knighthoods and baronetcies are sometimes conferred with such intentions, but I think them utterly unfit for that purpose. Instead of conferring distinction, they confound the man with hundreds of others. They depress rather than exalt him for they tend to lower the especial distinction of mind to the commonplaces of society. An intelligent people ought to recognize the scientific men among its people as a class. The aristocracy of the class should have distinction, such as to be worthy of those whom the Sovereign and the country should delight to honour and being rendered very desirable and even enviable in the eyes of the aristocracy by birth, should be unattainable except to that of science."

Such rewards therefore in Faraday's opinion should be used to honor the government that offered them and the cause of science in general, and not primarily to stimulate scientists to compete for them. Writing indeed in 1843 to an Irish scientist, Faraday observed[1] "I have always felt that there is something degrading in offering rewards for intellectual exertion, and that societies or academies, or even kings and emperors, should mingle in the matter does not remove the degradation, for the feeling which is hurt is a point above their condition, and belongs to the respect which a man owes to himself. With this feeling, I have never since I was a boy aimed at any such prize; or even if, as in your case, they came near me, have allowed them to move me from my course; and I have always contended that such rewards will never move the men who are most worthy of reward. Still, I think rewards and honours good if properly distributed, but they should be given for what a man has done, and not offered for what he is to do, or else talent must be considered as a thing marketable and to be bought and sold, and then down falls that high tone of mind which is the best excitement to a man of power, and will make him do more than any commonplace reward. When a man is rewarded for his deserts, he honours those who grant the reward, and they give it not as a moving impulse to him, but to all those who by the reward are led to look to that man for an example."

This high and austere conception of the proper motive of a scientist is strikingly exemplified by his refusal to accept either the

[1] *Ibid.*, 110–111.

Presidency of the Royal Society or of the Royal Institution. When his friend Tyndall urged him to accept the former (the highest scientific recognition that could be granted in England), Faraday [1] replied, "Tyndall, I must remain plain Michael Faraday to the last, and let me now tell you, that if I accepted the honour which the Royal Society desires to confer upon me, I would not answer for the integrity of my intellect for a single year."

2. Tyndall, Maxwell, Darwin and Wallace. Tyndall himself seems not to have been influenced in the slightest by economic motives. The son of poor parents, he made a success while still in his twenties as a railway engineer, only to abandon this, much against the advice of his friends, to study chemistry at the University of Marburg. Throughout his later scientific career he demonstrated again and again his indifference to material advantage. Thus he devoted the $30,000 of proceeds from his book on *Light,* originally delivered as lectures in the United States, to the furtherance of scientific training in America, while he also resigned his congenial and lucrative advisorship to Trinity House, because he believed Joseph Wigham, the inventor of a system of gas lights, had been unfairly treated by that organization.

In a similar way, Clerk-Maxwell had a kindling intellectual passion untouched by economic self-seeking. The fortunate possessor of a private income, his intellectual powers ripened early, and at the age of fifteen one of his mathematical papers was read before the Edinburgh Royal Society. From then until his death at the early age of forty-eight, he exercised his talents freely without money and without price, thereby consolidating the work of Faraday without receiving a penny, aside from his University salary, for his work.[2]

Similarly, Darwin exhibited an extraordinary zeal for science and for creative accomplishment. Handicapped by a severe illness, resulting from his expedition on the *Beagle,* which caused him almost ever-present nausea, Darwin nevertheless worked up to and beyond the limit of his endurance, not for wealth, as Senior would have us believe, (for the sale of Darwin's books did not begin to meet his expenses in the research necessary to issue them) but to help solve the fundamental problems connected with the constitution and development of life. In his charming autobiography he tells us with his characteristic honesty and insight of the motive forces of his life: [3]

[1] Tyndall, *op. cit.,* 192–193.

[2] See Campbell and Garnett, *Life of James Clerk-Maxwell;* and Glazebrook, *James Clerk-Maxwell and Modern Physics.*

[3] *Life and Letters of Charles Darwin,* edited by Francis Darwin, I, 55; 83.

"My love of natural science has been steady and ardent. This pure love has however been much aided by the ambition to be esteemed by my fellow naturalists—I cared in the highest degree for the approbation of such men as Lyell and Hooker—I did not care much about the general public—I am sure that I have never turned one inch out of my course to gain fame."

That this was not empty talk is evidenced by the nobility of his dealings with Alfred Russel Wallace, co-discoverer of the theory of evolution. As is well-known, Darwin had conceived his own particular theory of evolution as early as 1838 and then devoted himself for twenty years to patient investigation in order to determine its truth, only to be startled in 1858 by receiving a paper from Wallace, who was then in Malaysia, containing a theoretical statement of precisely the same major steps in evolution. Accompanying this manuscript was a letter asking Darwin to get the article published for him. Darwin's disappointment at finding that someone else had hit upon the theory before he had published it was naturally keen, but he concluded that he had no right to make any statement of his own priority and decided to send Wallace's paper to the Royal Society with a very warm commendation unaccompanied by any reference to his own work. He was thus ready to sacrifice, not only public fame, but the acclaim of his fellow-naturalists, lest he should in any way injure the opportunity of Wallace to secure credit for the theory. It was only because of the strong solicitation and pressure of Hooker and Lyell that he finally consented to let them attach a letter of his, which stated his twenty-year old theory, to the essay of Wallace. Wallace[1] in turn always refused to be considered as equal in his discovery to Darwin and painstakingly pointed out the priority of Darwin's work and the remarkable thoroughness of the latter's proof as contrasted with his own theoretical analysis.

Wallace indeed seems to have had little or no desire for formal honors. He declined D.C.L.'s from the Universities of Wales, Cambridge, and Oxford, saying on one occasion[2] that the granting of such a degree would involve "bother and ceremony and the having perhaps to get a blue or yellow or scarlet gown and at all events new black clothes and a new topper such as I have not worn this twenty years," and at another saying that "I have at all times a profound distaste for all public ceremonies and at this particular

[1] *Alfred Russel Wallace, Letters and Reminiscences*, by James Marchant, published both in one and two volumes; and Wallace's *My Life*.

[2] Marchant, *op. cit.*, 446.

time that distaste is stronger than ever," and going on to declare that he had more important engagements that week in the form of correcting examination papers, packing books, taking care of his garden and attending a meeting of his beloved land nationalization society. Wallace did not make money in science, and devoted his energies outside of science to such unpopular causes as Land Nationalization, Anti-Militarism, and Socialism.

3. Pasteur, Lister, Metchnikoff and Herschel. Equally lofty in his purposes was Louis Pasteur.[1] The son of a poor tanner, his patient and imaginative researches into the causes of diseased beer and wine not merely saved those French industries and made possible the purification of the milk supply, but they disclosed germs to be the cause of most diseases. His beautiful experiments disclosing the bacteria in the air to be the cause of contamination not only gave Lister the idea that hospital gangrene and putrefaction resulted from similar causes and thus directly led to the development of antiseptic surgery but also laid the basis for isolating the germs of other diseases and for preparing counteracting vaccines and antitoxins. Similarly, Pasteur's discovery of the causes of the silk-worm blight prevented the ruination of that industry, while his vaccine against anthrax proved to be the salvation of French cattle. His last great discovery was the isolation of the hydrophobia germ and the preparation of an innoculation which removed the danger of this disease. Huxley estimated that these discoveries had by the early eighties more than sufficed to cover the billion dollar indemnity levied upon France by Germany. Since then, the monetary savings effected, not only for France but for all countries, have of course increased.

Yet Pasteur neither profited financially from these discoveries nor did he seek to do so. He and his family lived a life of extreme simplicity in a small apartment in the *École Normale* where he taught, and he devoted his spare energies to arousing the public and the government to the necessity of further support for scientific research. When a grateful international public subscribed two and a half million francs for the founding of the Pasteur Institute, Pasteur and his associates Roux and Chamberland, turned over to it all the income from the sale of the hydrophobia vaccine, in the discovery of which they had risked their lives.

When Louis Napoleon manifested surprise that Pasteur did not seek to make a legitimate profit from the application of his discov-

[1] There are two remarkable biographies of Pasteur, R. Vallery-Radot, *The Life of Pasteur*, and Ducloux, *Pasteur, The History of a Mind.*

cries, Pasteur replied,[1] "In France, scientists would consider that they lowered themselves by doing so." His son-in-law says of him,[2] "he was convinced that a man of pure science would complicate his life, the order of his thoughts and risk paralyzing his inventive faculties, if he were to make money by his discoveries. For instance, if he had followed up the industrial results of his studies on vinegar, his time would have been too much and too regularly occupied and he would not have been free for new researches." Pasteur's basic hope and belief in his own words[3] was "that Science and Peace will triumph over Ignorance and War, that nations will unite, not to destroy, but to build and that the future will belong to those who will have done most for suffering humanity."

To Joseph Lister[4] belongs the honor of applying Pasteur's great discovery of the microbic causes of fermentation to medicine and surgery. Before Lister, hospitals were charnel houses where deadly infections spread from person to person and where death was probable in those cases where there was an external wound which permitted the germs to enter and to multiply. Thus nearly half of all amputations in hospitals resulted in death from hospital gangrene and blood poisoning. In 1865, Lister, reading Pasteur's paper on fermentation which proved that both fermentation and putrefaction resulted from the growth of microbes which did not come into existence from dead matter by a process of "spontaneous generation" but which sprang instead from pre-existent organisms, saw the cause of the hospital gangrene, blood-poisoning and pyaemia. To cope with this, he developed a solution of carbolic acid to wash wounds thoroughly and thus exterminate all germs already in the injured part. Doctors and surgeons were, at the same time, instructed to wash themselves in the same solution so that they would not carry infections, and dressings were devised which prevented fresh germs from entering from without. Although the Glasgow hospital in which Lister worked was built directly over a graveyard, where thousands, who had died of cholera in 1849, were buried, Lister kept his wards completely free from the infections which raged elsewhere, for the three years that he remained there, as he did at Edinburgh after he had left Glasgow.

The adoption of antiseptic surgery has produced such a change

[1] Vallery-Radot, *op. cit.*, 129.

[2] *Ibid.*, 129.

[3] *Ibid.*, 451.

[4] See J. T. Wrench, *Lord Lister, His Life and Work;* and Sir R. J. Godloe's *Lord Lister.*

in medicine by removing the danger from slight wounds if properly disinfected, and by making possible operations which otherwise would have been fatal, that Dr. W. W. Keen is justified in dividing the history of surgery into the periods of *before and after Lister.* Lister's discovery has beyond all question saved the lives of literally millions of men who otherwise would have died. Yet he did not seek financial profit in the slightest degree from his work but instead published it broadcast to the world. For years he had to face bitter and persistent opposition on the part of the English medical profession, despite the beautiful and convincing statistical proof which he produced of the actual success of antiseptic surgery in his hospital cases. In 1877, he gave up his Edinburgh position where he had crowds of devoted students and complete control over a hospital, to come to King's College, London, where students were fewer and hospital facilities poorer, solely in order to meet the hostile English doctors on their own ground and convince them of the merits of antisepsis.

Similarly Metchnikoff, Pasteur's great successor at the Pasteur Institute, almost starved himself in his youth to broaden his scientific training, and devoted himself to science through years of painful struggle with poverty and illness.[1] Later in his life he was unjustly accused of profiting by his preparation of pure sour milk. The truth of the matter was that large manufacturers wished to manufacture this preparation upon a large scale and asked Metchnikoff to recommend a technician who could be trusted to supervise its preparation. Metchnikoff recommended a needy young friend with a family, and then trained him for the position. The manufacturers later declared that they could not be certain of the success of the venture unless Metchnikoff gave his personal guarantee. In order to provide a future for his protégé, Metchnikoff permitted the company to use the formula of "sole provider of Professor Metchnikoff." Yet Metchnikoff did not have one iota of pecuniary interest in the concern, and only exposed himself to the attacks of those who misunderstood the situation in order to benefit a friend.

William Herschel, the father of modern astronomy, is another example of the dominance of other than economic motives.[2] A poor Hanoverian musician who went to England as a soldier and came to be a regimental band master, he rose rapidly in the musical world, becoming a church organist and an orchestra leader at Bath, the gay

1 See *Life of Elie Metchnikoff 1845–1916,* by Olga Metchnikoff.
2 See Agnes M. Clerke, *The Herschels and Modern Astronomy.*

watering place of the 18th century. In the pure zest of study, he became interested in astronomy and [1] "resolved to take nothing upon trust but to see with my own eyes all that other men had seen before." Although burdened with his several musical positions and with a large number of music pupils, he set out, against the advice of his sister, to construct by himself a telescope, and after two hundred failures, made a reflecting telescope five and a half feet in focal length with an aperture of five inches. Not satisfied with what he could see with this, he determined [2] to "carry improvements in telescopes to their utmost extent" and "to leave no spot of the heavens unvisited."

Though his musical duties were demanding much of his time, he began to make ever larger mirrors, first a seven foot telescope, then a ten, then a twelve, and finally a twenty. He made these virtually alone, at one time polishing the glass for sixteen consecutive hours, being fed at intervals by his sister as he worked. With this powerful telescope, he discovered the planet Uranus, which had hitherto been unobserved, and received in consequence the Copley Medal in 1781 from the Royal Society and was then elected a fellow of that body. Upon being praised for his "great discoveries," Herschel wrote to his sister "This shows how far they are behind. Let me get at it again. I will make such telescopes and such things—that is, I will endeavor to do so."

He now wanted to construct a forty foot telescope and upon receiving a royal pension of £200 a year, which was much less than he was making as a musician at Bath, he abandoned music and devoted himself exclusively to astronomy, making and selling small telescopes in order to accumulate funds for his giant telescope. He kept up his custom of intense application, at one time working seventy-two hours without a break. The dominant motive of his life was to see ever more and more of the heavens and to construct ever more powerful telescopes with which to effect this.

4. Huxley, Helmholtz, Gray and Agassiz. Huxley was another in whom the economic motive was apparently slight.[3] The son of an indigent and somewhat shiftless schoolmaster, he studied medicine, entered the navy, and was assigned as under-surgeon and zoologist to a surveying expedition sent out by the Admiralty on the *Rattle-*

[1] Clerke, *op. cit.*, 14.

[2] *Ibid.*, 17.

[3] See *Life and Letters of Thomas H. Huxley*, 2 vols., edited by Leonard Huxley; also Huxley's *Autobiography*, in the fourth volume of his essays, *Methods and Results*, 1–17.

snake. While on this expedition he became engaged in Australia to Miss Heathorn. Returning in 1850, he was naturally anxious to secure a position which would enable him to marry and continue the pursuit of zoology. He obtained a six months' leave of absence to work up the results of his investigations which was renewed several times. Although his work was brilliant enough to win the Royal Medal in 1852, after having only barely missed it the year previous, all his attempts to secure a scientific position were fruitless. Both he and Tyndall were rejected by the newly founded University of Toronto in favor of two Canadian residents who had political influence, while Huxley was successively turned down for positions at Aberdeen, Cork, and King's College, London. In addition, the Admiralty, in violation of a general pledge, refused to grant him funds to publish the major part of his *Rattlesnake* researches, while the Royal Society also refused to give financial support. To add to these barriers, the Admiralty warned him that they would not continue very much longer to grant additional leaves of absence. With such discouragement, it is small wonder that Huxley wrote to his betrothed early during this period as follows:[1] "To attempt to live by any scientific pursuit is a farce. Nothing but what is absolutely practical will go down in England. A man of science may earn great distinction but no bread. (He) is like an Esau who sells his birthright for a mess of pottage. Again if one turns to practise (i. e. medicine), it is still the old story—wait; and only after years of working like a galley slave and intriguing like a courtier is there any chance of getting a decent livelihood. I am not at all sure if it would not be the most prudent thing to stick by the Service: there at any rate is certainty in health and in sickness."

After having been elected a Fellow of the Royal Society, he again wrote his fiancée,[2] "My opportunities for seeing the scientific world in England force upon me every day a stronger and stronger conviction. It is that there is no chance of living by science. I have been loath to believe it but it is so. There are not more than four or five offices in London which a Zoologist or Comparative Anatomist can hold and live by. Owen, who has a European reputation, second only to that of Cuvier, gets as Hunterian Professor £300 a year, which is less than the salary of many a bank clerk. My friend, Forbes, who is a highly distinguished and a very able man, gets the

[1] *Life and Letters of Thomas H. Huxley,* 72.
[2] *Ibid.,* 74–5.

same from his office as Paleontologist to the Geological Survey of Great Britain. Now these are first rate men—men who have been at work for years laboriously toiling upward—men whose abilities, had they turned them into the many channels of money-making must have made large fortunes. But the beauty of nature and the pursuit of Truth allured them into a noble life and this is the result. A man who chooses a life of science chooses not a life of poverty, but, so far as I can see, a life of *nothing* and the art of living upon nothing at all has yet to be discovered."

Huxley goes on to write: "You will naturally think, then, 'why persevere in so hopeless a course.' At present, I cannot help myself. For my own credit, for the sake of gratifying those who have hitherto helped me on my way, for the sake of truth and science itself, I must work out fairly and fully complete what I have begun (i. e. the working up of the material collected on the *Rattlesnake*). And when that is done, I will courageously and cheerfully turn my back upon all my old aspirations. The world is wide and there is everywhere room for honesty of purpose and earnest endeavour."

Upon being informed that he had very nearly been awarded the Royal Medal in 1851, his spirits rose. Feeling some of the thrill of scientific accomplishment and recognition he wrote his lady:[1]

"I have at last tasted what it is to mingle with my fellows—to take my place in that society for which nature has fitted me, and whether the draught has been a poison which has heated my veins or true nectar from the Gods—, I know not, but I can no longer rest where I once could have rested. If I could find within myself that mere personal ambition, the desire of fame, present or posthumous had anything to do with this restlessness, I would root it out. But in those moments of self-questioning, when one does not lie even to oneself, I feel that I can say it is not so—that the real pleasure, the true sphere, lies in the feeling of self-development—in the sense of power and of growing *oneness* with the great spirit of abstract truth."

But as time went on and no opening appeared, he had many misgivings. Writing in 1852 to Miss Heathorn[2] he said, "Fate says wait and you shall reach the goal which from a child you have set before yourself. On the other hand, a small voice like conscience speaks of one who is wasting youth and life for your sake."

His non-scientific friends urged him to give up the unequal strug-

[1] *Ibid.*, 75.
[2] *Ibid.*, 87.

gle and to emigrate to Australia where he could marry and then either practice medicine or set up in business. In August, 1852, he writes to Miss Heathorn:[1]

"I must make up my mind to it if nothing turns up. However, I look upon such a life as would await me in Australia with great misgivings. A life spent in a routine employment with no excitement and no occupation for the higher powers of the intellect, with its great aspirations stifled and all the great problems of existence set hopelessly in the background, offers to me a prospect that would be utterly intolerable but for your love—sometimes I am half-mad with the notion of bringing all my powers in a surer struggle for a livelihood. Sometimes I am equally wild at thinking of the long weary while that has passed since we met. There are times when I cannot bear to think of leaving my present pursuits when I feel that I should be guilty of a piece of cowardly desertion from duty in doing it and there come intervals when I would give truth and science and all hopes to be folded in your arms."

"In 1853," writes Huxley's son,[2] "his hopes from his candidature crumbled away one after another, his leave from the Admiralty was coming to an end and there was small hope of renewing it, the grant from the government remained as unattainable as ever, the long struggle had taught him the full extent of his powers, only, it seemed to end by denying him all opportunity for their use."

Yet despairing as Huxley was, he nevertheless wrote in July when the clouds were blackest,[3] "I have become almost unable to exist without active intellectual experiment. I know that in this I can attain peace and rest such as I can attain in no other way. I have always felt how difficult it was for you to realize all this, how strange it must be to you that though your image remained as bright as ever, new interests and new purposes had ranged themselves around it, and though they could claim no pre-eminence, yet demanded their share of my thoughts. I make no apology for this—it is man's nature and the necessary influence of circumstances which will so have it, and depend, however painful our present separation may be, the spectacle of a man who had given up the cherished purpose of his life, the Esau who had sold his birthright for a mess of pottage[4] and with it his

[1] *Ibid.*, 87.

[2] *Ibid.*, 90.

[3] *Ibid.*, 91.

[4] Note that the figures in this metaphor have now been reversed as compared with Huxley's letter of 1851. Now the pursuit of science is the birthright, and one's livelihood the mess of pottage, instead of vice-versa as before.

self-respect, would before long years be over our heads, be infinitely more painful. . . . My course of life is taken. I will *not* leave London. I *will* make myself a position as well as an income by some kind of pursuit connected with science, which is the thing for which nature has fitted me if she has fitted anyone for anything. Bethink yourself whether you can cast aside all repining and doubt and devote yourself in patience and trust to helping me along my path as no one else could. I know what I ask and the sacrifice I demand, and if this were the time to use false modesty, I should say how little I have to offer in return."

His health suffered a breakdown in the early fall of 1853 and his fortunes were at their lowest ebb. Fortunately matters began to improve in the late fall. Churchill the publisher asked him to prepare a *Manual of Comparative Anatomy*, regular work on "Contemporary Science" was promised him for the *Westminster Review*, and there were good prospects for another book as well. In addition, it seemed probable that his friend Forbes would leave his post for another and that Huxley would succeed him. He was assured therefore of as large an income as he could earn in the Service with future prospects of considerable more. When the Admiralty peremptorily ordered him to rejoin his ship, he therefore felt justified in disregarding the mandate and he was accordingly dropped from the navy rolls. Shortly afterwards a succession of posts were offered to him which removed all fear of want and enabled him to marry Miss Heathorn the following year. From then on, Huxley was enabled to pursue science without privation although without high financial rewards. He was supremely happy not only in his laboratory work but also in the public discussions and controversies in which he engaged.

Helmholtz, the great German physicist, who touched virtually everything in the field of optics and physics, was another son of poor parents who embraced medicine in order to secure an opportunity to practice science.[1] As a youth, he made many experiments in physics and, in his words, his interest in this type of problem "grew into an absorbing impulse, amounting even to a passion. This impulse to dominate the actual world by acquiring an understanding of it, or what I think, is only another expression for the same thing, to discover the causal connection of phenomena, has guided me through my whole life."

His researches and writings on the conservation of force and on fermentation caused him to be promoted to the scientific division of

[1] See Helmholtz, "An Autobiographical Sketch," in *Popular Scientific Lectures*, II, 266–91, also L. Konigsberger, *H. L. F. von Helmholtz.*

the medical branch of the army and from thence to university life where he rose rapidly. Summing up his motives for pursuing science at a dinner given in honor of his seventieth birthday, Helmholtz pointed out in the following words that the incentive to work for the general welfare of society increased as one progressed in his career:[1] "I should be unjust if I said that the good of humanity appeared to me from the outset, as the conscious object of my labors. It was, in fact, the special form of my desire for knowledge which impelled me, and determined me, to employ in scientific research all the time which was not required by my family. The two restrictions did not indeed require any essential deviation from the aims I was striving for. My office required me to make myself capable of delivering lectures in the University: My family that I should establish and maintain my reputation as an investigator. The state which provided my maintenance, scientific appliances, and a great share of my free time, had, in my opinion, acquired thereby the right that I should communicate faithfully and completely to my fellow-citizens, and in a suitable form that which I had discovered by its help. . . .

"In the first half of my life, when I had still to work for my external position, I will not say that, along with a desire for knowledge and a feeling of duty as servant of the State, higher ethical motives were not also at work; it was however difficult to be certain of the reality of their existence as long as selfish motives were still existent. This is perhaps the same with all investigators. But afterwards when an assured position has been attained, when those who have no inner impulse towards science may quite cease their labours, a higher conception of their relation to humanity does influence those who continue to work. They gradually learn from their own experience how the thoughts which they have uttered, whether through literature or through oral instruction, continue to act on their fellow-men, and possess, as it were, an independent life."

The scientist, says Helmholtz, "sees that he is in the service of something everlastingly sacred, with which he is connected by close bands of affection. His work thereby appears to him more sanctified. Anyone can perhaps apprehend this theoretically, but actual personal experience is doubtless necessary to develop this idea into a strong feeling."

A scientist of lesser note but of a more self-sacrificing spirit was Asa Gray.[2] Appointed to a professorship at Harvard in 1842, he found that there was neither a botanical library nor an herbarium

[1] Helmholtz, "An Autobiographical Sketch," *op. cit.*, 287–89.

[2] See W. G. Farlow, *Biographical Memoirs of Asa Gray.*

with which to work, and no University funds available with which to purchase them. Although Gray had absolutely no resources aside from his salary, which was $1000 at first and some years later, $1600, he nevertheless managed to live on a fraction of his stipend and to bring together with the remainder a large library as well as to build up a noteworthy herbarium. He gave all this in 1864 to Harvard on condition that the collection should be housed suitably and turned over to the University a collection of approximately 200,000 specimens together with a library of 2200 books and thousands of pamphlets.

No one seems to have ever had more energy and daring than Louis Agassiz,[1] who possessed an almost infinite relish for the process of collecting and classifying. His accomplishments in the field of natural science were extraordinary. So far as one can see, Agassiz was not greatly swayed by any desire to benefit mankind at large or posterity. He was instead tremendously absorbed by the fascination of natural science, supremely confident in his own ability and future, and greedy for popular applause. The son of a Swiss pastor, he studied medicine and natural science at various German Universities. With a student's allowance of only $250 a year, he employed an artist, Dinkel, on full time to draw for him and another man on part time; and when only twenty-two he wrote to his father: "I wish it may be said of Louis Agassiz that he was the first naturalist of his time, a good citizen and a good son, beloved by those who know him. I feel within myself the strength of a whole generation to work towards this end and I will reach it if the means are not wanting."

After securing the degree of PH.D. with a brilliant dissertation, he embarked upon the enormous task of preparing a complete work upon fossil fishes. After a year's research at home, he went to Paris where he became the friend of Cuvier and Humboldt. In 1832, when only twenty-five, he was appointed to a professorship in the Lyceum at Neuchâtel at the modest salary of $400 a year. He brought with him his artist whom he had kept constantly in his employ. Mrs. Agassiz also assisted ably with drawings until the children began to arrive. A bibliographer also worked with him. At Neuchâtel he not only founded a scientific society and established a museum, but he

[1] There are two good biographies of Agassiz: Marcou's *Life, Letters, Work of Louis Agassiz*, 2 vols. is a graphic life-story by a scientist who worked with Agassiz both in Switzerland and in the United States. It gives intimate pictures which are lacking, or glossed over, in the work by Agassiz' second wife, Elizabeth Carey Agassiz, *Louis Agassiz.*

[2] Marcou, *op. cit.*, I, 30.

launched into extensive research and publication in a number of different lines in addition to his work on fossil fishes. The publisher of his book on fossil fishes withdrawing because of the expense, Agassiz became his own publisher and set up a lithographic establishment at Neuchâtel in order that his plates might be properly executed. This plant came to employ twenty men and its capacity was in excess of even the monumental works upon which Agassiz was engaged. He therefore added a secretary, Desor, to his employ, whom he busied with making translations to keep the printers and lithographers busy. Then he added a scientist, Gressly, another worker, Vogt, and still another handy man. Additional illustrators and assistants were also engaged. Agassiz' arrangements with all these men were most unsystematic. He would offer to provide board and lodging, which he in part furnished in his own home, with the understanding that when anyone [1] "wanted money, if Agassiz had any, he would give him some, if Agassiz had none, he would have to wait until Agassiz' purse was replenished in some way!"

Becoming interested in glaciers and the researches of some friends, Agassiz developed the theory of glacial periods and the ice-age. He conducted elaborate and expensive expeditions into the glaciers, in which he superintended the work of large parties of scientists. In addition to this he kept open house at Neuchâtel to virtually all the scientists of Europe. As might be imagined, Agassiz' publishing ventures were extremely costly. He seems to have had little or no business acumen and published all of the fourteen books which he issued in ten years at a loss, giving away many copies lavishly in order to spread the knowledge of his work. The lithographic plant failed in 1845 and embroiled Agassiz in still deeper financial difficulties.

Agassiz' salary at its maximum does not appear to have exceeded $800 a year [2] and he had a wife and three children to support. He would start costly projects, not knowing where the money to conduct them was coming from and would then call upon his relatives, his friends and the state to help him—which they generally would; only to find that he had then embarked on some new project far more expensive than the last. Agassiz was therefore constantly in debt, and, having exhausted his credit, left Neuchâtel in 1846, and leaving his family with his wife's brother in Germany, pushed on to Paris where he wrote two books and hurried them through the press. Receiving, through the recommendation of Sir Charles Lyell, an invitation to deliver a course of lectures at the Lowell Institute in Boston,

[1] Marcou, *op. cit.*, I, 119.
[2] Marcou, *op. cit.*, I, 259.

he sailed for America in September, 1846 with his bridges burned behind him; there was no possibility of returning to Neuchâtel and all opportunities in London and Paris were closed to him. His wife was dangerously ill and the three children were dependent upon her relatives. Success in America was necessary, but he was handicapped by not being able to speak English. He taught himself English during the voyage across the Atlantic and charmed his audiences. Almost instantly he became a great favorite and immediately began to make plans for ambitious zoological work. He hired a house by the sea in East Boston for $1000 a year which he occupied with his secretary, Desor, and another of his Swiss scientists. Turning most of it into a museum, he began to collect marine specimens in great profusion for his own and the public's delectation.

Receiving an appointment to a professorship at Harvard with a yearly salary of $1600 and, in addition, making some money on the side as a lecturer, Agassiz and his secretary Desor, from whom he soon parted, proceeded to invite a large number of his assistants at Neuchâtel to come to Cambridge and work with him. These began to pour in during the fall of 1848, so that at one time there were twenty-three persons, including some children, who were dependent upon him and who filled to overflowing the small house which Agassiz had now rented in Cambridge. There were mattresses on the floors of every room save the dining room. Agassiz was now spending at the rate of $12,000 a year although his income from Harvard and the Lowell Institute amounted to less than a quarter of this sum. In the meantime, his wife died abroad after a lingering illness. Agassiz married again in 1850 and his new wife sought to stabilize his life. The children were brought over and Mrs. Agassiz vainly tried to make her husband live within his income; failing this, with the assistance of Agassiz' son, she started a school for girls in her house which soon became famous and in time made the family fortunes less desperate.

Although heavily burdened with debt, Agassiz now determined that he must have "the best arranged and most perfect museum in the world." After raising $62,000 from his Boston admirers, he laid the cornerstone of the museum without being assured of further funds. Once the building was started, he succeeded in getting subscriptions of $71,000 from the citizens of Boston and, to the astonishment of everyone, so captivated the hard-headed Massachusetts legislators, whom he told that he had "no time to make money," that they voted him a state grant of $100,000. Agassiz immediately began to purchase enormous collections of books and specimens abroad only to find that the payment of the state grant was delayed and that when

it was made available, the ten trustees of the museum, knowing his proclivities, would allow him only to spend the interest and not the principal. For the remaining years of his life Agassiz struggled to finish his museum, always heavily in debt, and ever launching out into wider programs for its development. In the fourteen years before his death, he raised no less than $700,000 for its creation and support. He became so wrapped up in the museum that he came to regard it as a part of himself. George Peabody, the banker, offered to endow it liberally on condition that instead of the Museum of Comparative Zoology, which one of the original donors had prescribed as its name, it should be called the Peabody Museum. "That," said Agassiz to a friend;[1] "I cannot accept." To this, the friend replied, "of course it will be Agassiz' Museum." "Yes," said Agassiz, "you have guessed my secret."

5. The Dominance of Non-Commercial Motives in the Lives of Men of Science. It will have become apparent that such non-economic motives are not confined to those with independent means. Many scientists have of course had independent incomes which have permitted them to pursue science rather than business of whom, Boyle,[2] Cavendish,[3] Lord Rayleigh, Romanes,[4] Galton,[5] Darwin, and Alfred Russel Wallace are notable examples. But others such as Faraday, Tyndall, Huxley, Pasteur, Helmholtz, Metchnikoff, Agassiz, Pupin, and a multitude of others struggled painfully upwards against all manner of difficulty and, although sadly in need of money, would not go into business to obtain it, but instead followed science where the material rewards were infinitely less.

The complex of non-economic motives which science and discovery call into being are not only strong enough to overcome the pressure of poverty but in many cases are also sufficient to overcome powerful tendencies towards a sporting life. Thus Charles Darwin's chief passion in his early years was shooting. He was but an indifferent student at Cambridge and although Professor Henslow had aroused in him an interest in collecting, he gave every evidence as a young man of settling down as a shooting and fox-hunting English squire. Then came the voyage of the *Beagle,* which fastened Darwin's atten-

1 Marcou, *op. cit.,* II, 142.

2 See Thorpe, Essays in *Historical Chemistry,* 1–31, also Flora Masson, *Robert Boyle.*

3 Thorpe, *op. cit.,* 79–97.

4 See *Life and Letters of George John Romanes,* by Mrs. Romanes.

5 See Francis Galton, *Memoirs of My Life,* and Karl Pearson's *Life of Francis Galton.*

tion upon a whole range of problems that challenged him and that gradually overpowered his old interests. Writing towards the end of his life Darwin spoke of this change:[1] "Looking backwards, I can now perceive how my love for science gradually preponderated over every other taste. . . . I discovered that the pleasure of observing and reasoning was a much higher one than that of skill and sport."

In a very similar manner, Darwin's cousin, Francis Galton, upon his graduation from Cambridge, spent a number of aimless years of travel in the near East, characterized by at least some dissipation. Upon his return to England "to learn" in his words "the A. B. C.'s of the life of an English country gentleman," he became much engrossed in hunting, riding, drinking, and gambling, but began to find in the fascination of his tinkering with a printing telegraph another type of satisfaction. Perhaps for the unconscious purpose of harmonizing the divergent impulses of sport and science, he embarked upon a second expedition for Africa; this time carefully planned with definite geographical aims. By the time he returned his scientific interests had won the mastery.

6. The Dominance of Non-Commercial Motives in "Practical" Scientists. It may be urged that the dominance of these non-economic motives may be characteristic of the gentle type of mind and of recluses such as the Quaker John Dalton,[2] the great American physicist, Willard Gibbs,[3] and Tait,[4] the Scotch physicist, but that it is incompatible with the qualities needed by men of affairs. But this same willingness to work for other than profit-making purposes is seen in the lives of those scientists who have also been business men. Thus Joule, the discoverer of the mechanical equivalent of heat and energy, was a brewer,[5] and Lavoisier an efficient member of the Fermé-général in the reign of Louis XVI.[6] These men devoted a large share of their energies to pure science and their work ultimately had enormous economic significance although their scientific efforts did not receive any economic reward.

[1] *Life and Letters of Charles Darwin*, I, 52–53.

[2] For the life of Dalton, see *The Dictionary of National Biography*, XIII, also Pattison-Muir, *Heroes of Science; Chemists*, 106–154, Sir Henry Roscoe has also written a biography of Dalton in the *Century Science Series*.

[3] Professor H. A. Bumstead gives a biographical sketch of Gibbs in *The Scientific Papers of J. Willard Gibbs*, I, xiii–xxvii.

[4] See the *Life and Scientific Works of P. G. Tait*, by C. G. Knott.

[5] See a short account of Joule's life and work in *Nature*, XXVI, 617–620.

[6] Thorpe, *op. cit.*, 123–148.

The experience of Perkin,[1] the inventor of artificial dye-stuffs, is a somewhat similar case. Discovering the process as a seventeen-year-old boy, he secured a patent upon it and began its manufacture. After nineteen years of successful production he sold his factory, and with a comfortable income settled down, at the early age of thirty-six, to devote the rest of his life to pure research, and during the forty-three remaining years of his life made brilliant contributions to the field of organic chemistry. He is said to have patented his discovery solely in order that he might be able to indulge his taste for research untroubled by financial worries.

Alexander Agassiz, unlike his father Louis, combined much of his father's scientific zeal with remarkable business talents.[2] As a young man he acted as the very efficient administrative head of the museum while carrying on a large amount of original scientific work. His museum salary proving insufficient to care for his family alone, to say nothing of furnishing funds for the extensive research that he planned, he felt compelled to devote two years to putting two copper mines that were then little known, namely the Calumet and the Hecla, upon a sound basis.[3] These mines proved to be veritable Golcondas and Agassiz became a millionaire. For nearly forty years he served as the President of the Calumet and Hecla Mining Co. which, during his presidency, paid out more than one hundred million dollars to its stockholders. Yet his chief interest continued to be in zoological and oceanographic research. Immediately, after the two crucial years with the Calumet and Hecla, when he was still poor, since the dividends had not yet begun to pour in, he devoted his spare energies to the completion of a long projected work on the Echini.

Throughout his life he spent most of his time in scientific research and by poetic justice was enabled to put the museum which his father had founded upon a firm basis by gifts aggregating more than a million dollars.

1 See Benjamin Harrow, *Eminent Chemists of Our Time*, 1–18.

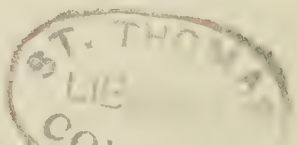
2 *Letters and Recollections of Alexander Agassiz*, edited by G. R. Agassiz.

3 Just before he left for the copper mines, he told Charles W. Eliot, then relatively unknown, why he was leaving the museum. "Eliot, I am going to Michigan for some years as superintendent of the Calumet and Hecla mines. I want to make money: it is impossible to be a productive naturalist in this country without money. I am going to get some money if I can and then I will be a naturalist. If I succeed, I can then get my own papers and drawings printed and help my father at the Museum." *Letters and Recollections of Alexander Agassiz*, 61.

Werner von Siemens, the virtual founder of the electrical industry in Germany, was even more remarkable for his ability as a business organizer and as both an applied and pure scientist.[1] An ardent lover of science as a youth, he whiled away his days in a military prison to which he had been sentenced for acting as a second in a duel, in experiments, and there discovered a method of galvanic plating which he was able to patent and from which he was able to derive an income. Other experiments also proved to be financially lucrative. Upon reflection, however, he determined, as he says[2] "that the chase of discoveries, by which I had allowed myself to be carried away through the facility of a first success, would, if continued, probably be my own and my brother's ruin. I accordingly got rid of all my inventions, sold even my share of the manufactory set up in Berlin, and devoted myself again with heart and soul to serious scientific study." He became interested, however, in the development of telegraphy and, although an officer in the army, started a small plant to manufacture telegraphic apparatus. He finally resigned from the army in order, as he said[3] "to raise to the utmost by good work the business which already bore my name and to obtain personal regard in the world as a man of science as well as technologist. Although my inclinations drew me altogether to purely scientific investigations, yet I perceived that I must turn my whole energies to technical work, as its results could alone procure the means and opportunity for scientific work—and did in fact procure them."

Von Siemens was, however, never content with purely practical work; he was constantly thinking of the theoretical aspects of his researches and even early in his industrial career published a number of very striking scientific papers. Later in life, when his electrical business had assumed gigantic proportions, he began, under the stimulus of membership in the Berlin Academy of Sciences, to devote the major part of his time to pure science, although still continuing as head of his firm. Siemens indeed said of himself:[4] "Scientific research was my first, my early love and it has retained by affection. . . . In very truth scientific investigation must not be a means to an end. The German *savant* has always been justly distinguished by this, that he pursues science on its own account, for the satisfaction of his thirst for knowledge, and in this sense I have always been able to reckon myself more to the *savants* than to the engineers, since the

[1] See the *Personal Recollections of Werner Von Siemens.*
[2] *Personal Recollections of Werner von Siemens,* 43.
[3] *Ibid.,* 104.
[4] *Ibid.,* 353.



prospective profit has either not at all, or only in special cases, guided me in my choice of scientific work."

Lord Kelvin [1] is another noteworthy example of a great discoverer in the field of pure science who was nevertheless a successful business man. As director of the Atlantic Cable Co., as well as its scientific advisor, he received a considerable amount of profits, which he devoted primarily to the founding of scholarships in experimental physics in his own University of Glasgow. In addition he invented many electrical instruments and other devices which he patented and manufactured, deriving comfortable sums from their sale. As is well known, however, these were by no means his chief interests. His main energies were devoted to experimentation and discovery in pure physics.

It may be objected that these very citations of scientists who were at the same time business men show at once how necessary is an economic sufficiency for the pursuit of science, and how, in the cases of Von Siemens and Kelvin, the scientists sought to make a profit from their discoveries and acted indeed like traditional economic men. This criticism, however, ignores the fact that over a wide field of their activity, namely their investigations in pure science, the economic motive was virtually either not in operation or was attenuated beyond recognition. Nor were these investigations in their effects outside the realm of economic life, on the contrary, most of them served ultimately to contribute to economic well-being.

Furthermore, is it not evident that these men, even in their business pursuits, had at least a great deal of the spirit which animated them in their scientific moments, namely love of creativeness, and the desire to do a workmanlike job?

But if there are cases of scientists who are also successful business men, there are also numerous instances where worldly success has militated greatly against further scientific accomplishment. The experience of Newton [2] seems to have been an illustration of this.

[1] The definitive biography of Lord Kelvin is that of Sylvanus P. Thompson, *The Life of William Thomson, Baron Kelvin of Largs*, 2 vols. See also Andrew Gray, *Lord Kelvin; An Account of his Scientific Life and Work*, and A. E. Russell's *Lord Kelvin*. The early life of Kelvin is given in *Lord Kelvin's Early Home*, by Elizabeth King and Elizabeth Thomson King.

[2] For conventional biographies of Newton filled with the spirit of hero worship, see those of Sir David Brewster, *The Life of Sir Isaac Newton* (1839), 1 vol., also *Memoirs of the Life, Writings and Discoveries of Sir Isaac Newton*, 2 vols. (1855). I am indebted to Miss Penn Shelton for an analysis of the latter work. For a keen analysis of the life of Newton, see Augustus De Morgan. *Essays on the Life and Work of Newton*, collected and edited by P. E. B. Jourdain, (1914.)

His ability was given full scope during his life as a Cambridge don, where he made his discovery of the laws of gravitation and of differential calculus. Upon attaining the office of master of the mint, however, with its comfortable salary, his creative genius ceased to function and the remaining thirty years of his life, although loaded with honors, were sterile of accomplishment.

III. THE INCENTIVES OF CAPTAINS OF INDUSTRY

If we turn from a consideration of the incentives of scientists to those of business men and millionaires, we would seem to be entering a group in which the non-economic incentives are virtually absent. In business one has to make money in order to survive, and one's success is estimated in terms of the amount of wealth one is able to accumulate. The whole standard of business activity is virtually that of the dollar as the common denominator for all values. It would be small wonder then if business men were exclusively possessed by the desire to make money and to make as much of it as possible, not only to secure personal enjoyment, but to secure power, reputation, popular esteem, etc., as well. This would not, of course, prove that were the rules of the "game" different, these incentives might not operate without regard to pecuniary profit. Any evidence of non-commercial incentives therefore that can be found in business today very appreciably underestimates their real strength.

1. Hill and Others. James J. Hill, the "empire-builder" of the Northwest, seems to have been possessed by the passion for accomplishment far more than by the desire to make money.[1] Acquiring in the seventies the St. Paul and Pacific Railroad, a broken-down and bankrupt Minnesota line, he speedily built it up and step by step extended it towards the Pacific. There can be little doubt that it was the lure of having a transcontinental line under his direction, symbolized in his watchword, "Westward Ho," which made him reach out towards the west coast and finally create the Great Northern system. He had planned to retire when he accumulated $100,000 and to spend the rest of his life in the enjoyment of literature and art, but when that time came, he found himself engrossed with the fascination of accomplishment and he remained in harness until the end of his life. He refused to accept a salary for his services to his road and steadfastly declined to speculate in the stocks of his company or to manipulate them for his advantage. In addition, he

[1] See J. G. Pyle, *The Life of James J. Hill*, 2 vols.

sternly repulsed suggestions of how he might profit by buying up land where his stations were to be located.

In 1899, he purchased as a personal investment a vast area of ore lands for four millions of dollars. When it was seen that these lands would become immensely valuable, Mr. Hill turned them over to the Great Northern Railroad at cost and shared the gains with all the stockholders of that company. Up to 1916, the net income from these properties had amounted to between twenty-five and thirty millions, while the future income will probably be many times this amount.

This striking illustration of how a man may come, even in business, to attach his chief loyalties to the institution which he has helped to create, has been duplicated recently by Mr. Julius Rosenwald, who, without solicitation, has transferred a large part of his private fortune to Sears, Roebuck and Company in order to ease its financial condition, although there was not the slightest legal obligation upon him to do so.

Sometimes the zest of business so possesses men that they are entirely oblivious to making money. "Captain" W. R. Jones, the most efficient producer of steel in the history of the industry, seems to have been such a one.[1] Up to the age of thirty-four, he was somewhat irresponsible, and, failing to secure promotion in Johnstown, Pa., he went to Pittsburgh, where Carnegie made him superintendent of one of his works. Within less than two years, Jones had increased the mill's output twelve-fold, and from then on continued to break all world's records, and succeeded in making America, and not England, the center of steel production. It was remarked of Jones that he earned the most and received the least of all the officials of the Carnegie Company. He refused a partnership in the company, when it was offered by Mr. Carnegie, which would have made him a millionaire, saying,[2] "No, I don't want to have my thoughts running on business. I have enough trouble looking after these works. Just give me a hell of a salary if you think I am worth it." Carnegie replied, "All right, Captain, the salary of the President of the United States ($25,000) is yours." "That's the talk," rejoined Jones. Yet Jones was directly the creator of millions of dollars of profit which annually rolled into the pockets of the Carnegie partners and shareholders. Money meant virtually nothing to him. He gave it away and died with little. His joy came from the competition itself. He

[1] For an account of Jones and his methods, see H. N. Casson, *The Romance of Steel*, 20–33, also *The Autobiography of Andrew Carnegie*, 202–204.

[2] *The Autobiography of Andrew Carnegie*, 203.

wanted to surpass all rivals, to be constantly breaking records, and the height of his triumph came, when his former employer, who had refused him promotion, came to the Carnegie works and remarked,[1] "Well, Bill, I see that I hired the wrong Jones."

2. Henry Ford and Others. With Henry Ford, the passion for creative accomplishment has apparently always been the main urge for effort.[2] As a boy his "toys were all tools," and while serving his apprenticeship as a machinist, he worked evenings apparently without pay at watch-repairing in a jeweler's shop, making, amongst other watches, one that had two dials and kept two kinds of time. His father, in order to wean him away from being a machinist, offered him a forty acre woodlot if he would live upon the farm. Ford accepted in order to get married. He began cutting the timber and spent all his spare time in his workshop over the proper construction of a gas engine in which he had become interested some years before. Having cut all the timber on his lot, he accepted a job as engineer and machinist with the Detroit Electrical Company at forty-five dollars a month. He moved his tools to the city and worked at his engine every night after finishing work as well as all of every Saturday night. It seems to have been as much the spirit of inventiveness that led him to experiment in this way as the desire to make a profit from the development of his motor. Finally the company for which he worked offered him the plant superintendency if he would give up his experiments and devote himself to "something useful." Feeling that this was the parting of the ways, he left the electrical company, and although virtually penniless, threw his whole energies into the automobile business. He was first associated with the Detroit Automobile Company, but left them because their "main idea seemed to be to get the money"[3] and because he believed that they were not the agency to realize his ideas. He then continued his experiments in his little shop while pondering over proper business methods. He came to the conclusion that[4] "the most surprising feature of business as it was conducted was the large attention given to finance and the small attention given to service." This he says, "seemed to me to be reversing the natural process, which is that the money should come as the result of work and not before work." He

[1] H. N. Casson, *The Romance of Steel*, 27. Jones had been passed over in Johnstown in favor of another employee of the same name.

[2] See Henry Ford, *My Life and Work*, in collaboration with Samuel Crowther.

[3] *Ibid.*, 36.

[4] *Ibid.*, 37.

further took issue with the prevailing business practice under which [1] "an article apparently was not built with reference to how it could serve the public, but with reference solely to how much money could be had for it—and that without any particular care whether the customer was satisfied. To sell him was enough. For instance, in automobiles, there was not much concern as to what happened to the car once it had been sold. If it broke down and had to have parts replaced, then that was just bad luck for the owner. It was considered good business to sell parts at the highest possible price on the theory that since the man had already bought the car, he simply had to have the part and would be willing to pay for it.

"The money influence" says Ford,[2]—"the pressing to make a profit on an 'investment' and its consequent neglect of or skimping of work and hence of service showed itself to me in many ways. Most men want to be free to work; under the system in use they could not be free to work. During my first experience I was not free—I could not give full play to my ideas. Everything had to be planned to make money; the last consideration was the work.

"My idea was then and still is that if a man did his work well, the price he would get for that work, the profits and all financial matters would care for themselves. I determined absolutely that I would never join a company in which finance came before the work or in which bankers and financiers had a part. If there were no way to get started in the kind of business that I thought could be managed in the interest of the public, then I simply would not get started at all. For my own short experience . . . was quite enough proof that business as a mere money making game was not worth giving much thought to and was distinctly no place for a man who wanted to accomplish anything." [3]

In Mr. Ford's opinion,[4] "A manufacturer is not through with his customer when a sale is completed. He has then only started with his customer. A man who bought one of our cars was in my opinion entitled to the continuous use of that car and therefore if he had a break down of any kind, it was our duty to see that his machine was put into shape again at the earliest possible moment."

Ford's philosophy is then first to make as good a product as you

[1] *Ibid.*, 38.

[2] *Ibid.*, 44.

[3] Mr. Ford adds however "Also it did not seem to me to be the way to make money. I have yet to be demonstrated that it is the way. For the only foundation of real business is service." *Ibid.*, 41.

[4] *Ibid.*, 41.

can, and constantly seek to improve it—profits will come as by-products but they should not be sought directly.[1] The main task of business is therefore to produce goods and not dollars. Business to Ford is not something to be shed as soon as one secures a comfortable income. It is an opportunity constantly to exercise one's creative powers. "Life," as he puts it, "is not a location but a journey. Even the man who most feels himself 'settled' is not settled—he is probably sagging back. Everything is in flux, and was meant to be. Life flows. We may live at the same number of the street, but it is never the same man who lives there."

Nor does this seem to be merely lip-service to the ideal. Mr. Ford's record of constantly cutting the price of his car, his increasing wages far above the competitive level, his planning of work so as to absorb his proportionate quota of cripples, all indicate his attempts to live by his philosophy of management.

Ford is not content with confining these methods to automobile manufacturing. He has extended them to his farm, to his hospital, to his railroad, and is now applying them to the steel industry with conspicuous success.[2] He is anxious to test them out also in nitrate manufacture, in developing power and carrying on miscellaneous manufacturing. He indeed says of his organization[3] "We are, in effect, an experimental station to prove a principle."

There are others who hunger not only to demonstrate an ideal but to acquire personal power and control. Mr. E. H. Harriman was such.[4] Speaking to John Muir in the nineties before he had carried out most of his projects, he said:[5] "I never cared for money except as power for work. What I most enjoy is the power of creation" and his biographer writes[6] that, "he always said that he valued money primarily for the power it gave him to do constructive or

[1] Mr. Ford states his conception of the true place of the manufacturer as follows: "He is an instrument of society and he can serve society only as he manages his enterprises so as to turn over to the public an increasingly better product at an ever decreasing price, and at the same time to pay all those who have a hand in his business an ever-increasing wage, based upon the work they do. In this way, and in this way alone, can a manufacturer justify his existence." *Ibid.*, 134.

[2] The Federated Engineering Societies reports that while Ford is working his men an 8 hour day and paying them 75 cents an hour (twice the wage of the rest of the steel industry) he is able to produce steel at a much lower cost than the U. S. Steel Company *The Twelve Hour Day in Industry*, 205–06.

[3] Henry Ford, *My Life and Work*, 273.

[4] See George Kennan's, *E. H. Harriman, A Biography*, 2 vols.

[5] *Ibid.*, II, 352–53.

[6] *Ibid.*, II, 352.

creative work, and he therefore strove to amass wealth, but it was primarily the work, not the money, that interested him."

While this creative desire was undoubtedly operative with Harriman, as was evidenced by his building up the Union Pacific System from its former shell, yet it was not always predominant, as his overcapitalization of the Chicago and Alton showed. It may well be doubted indeed whether the creative spirit was as strong in Harriman as the desire for power and for domination. He once remarked that he wanted to run the railroads of the country from his little office in Wall Street. The battle which he waged with Hill for the control of the Burlington, and the Northern Pacific was probably caused more by the conflicting desires for domination of these two strong men than by a weighing of the actual economic advantages involved.

Similarly, in so far as one can analyze his motives, J. P. Morgan[1] seems to have been swayed more by the desire for power and distinction than for money as such. He was a notoriously poor buyer of properties for consolidation, and in the formation of the United States Steel Company, he was seemingly careless about the amounts that he allowed others to make. His own profits from this deal are said to have been three millions, and these, while large, were much less than the gains made for others. Mr. Morgan's fortune indeed was not conspicuously large compared to many others, yet the power wielded by Mr. Morgan, and now by his son, is out of all proportion to the family wealth, and it may be surmised that it is the power and not the profit that constitutes the primary source of fascination.

IV. THE MOTIVES OF MANUAL WORKERS

1. Some Illustrations of Non-Commercial Incentives. If we move down the economic ladder from millionaires to manual workers, we find other motives than the purely economic present here as well. Even in the midst of an industrial system whose dominant principle is acquisition, and under a high specialization of labor which operates powerfully to decrease the love of work, a large number of instances continually demonstrate that man does not work for money alone. R. B. Wolf, an engineer skilled in pulp and paper manufacture, is responsible for some most interesting recent experiments.[2] Taking hold of a somewhat inefficient paper mill, he established a system of continuous records whereby the workmen could measure the efficiency

[1] See Carl Hovey's, *The Life Story of J. P. Morgan.*

[2] See especially his, *Non-Financial Incentives. Publications of the American Society of Mechanical Engineers.* No. 1673 (1918).

of their work as respects quantity, quality, and cost, from day to day and with other workmen as well as in terms of an ideal standard of quality agreed upon both by management and by men. Although no bonuses were offered for better output, and although all workers from the superintendent down were on time and not on piece wages, an increase of the "yearly production from 42,000 tons to 111,000 tons was secured without adding to the number of digesters for cooking the pulp, or wet machines for handling the finished product," together with an improvement in the quality of the paper "from the poorest to the very best." Mr. Wolf goes on to say, "Due to the intelligent suggestions which came from our men all over the plant, we were able to make very radical changes in the manufacturing processes. Entirely new methods of preparing our wood, making acid bleaching, etc., were created, all of which were paid out of the earnings."

Since the men did not profit financially from this, it follows, as Mr. Wolf says, that this "increased effort, therefore, came entirely from a desire within the individual to be productive." "I maintain," he says, "that this was all the result of the freedom our men were experiencing, because they were working in an environment which stimulated thinking. They had ample opportunity constantly to increase their knowledge of the underlying natural laws of the process and were therefore able to realize the joy which comes from a conscious mastery of their part of the process."

Mr. Wolf has applied this principle of enlisting the interest of the worker in a number of other plants with invariable success. There are many other illustrations of this same tendency of workmen to respond, even while knowing that this increased effort helps their employer rather than themselves, and despite their fear that the increased effort will fill up the stocks of goods more quickly and thus create more unemployment.[1] The steel-workers under "Captain" Jones would work at a break-neck pace in order to break records and to have the privilege of hoisting over their mill the old broom-stick which was the championship emblem. Similarly in a California felt-mill that has recently established quality records and scores, comparable in principle to those of Mr. Wolf, the men have become very zealous to better their score as well as to surpass others, while a fruit-packing plant in the same state has greatly increased its output by making it possible for its workmen to know their progress. Sim-

[1] This is not the place to discuss the extent to which this fear is justified. It is sufficient to point out that it is real and that the creative spirit and the desire for recognition must indeed be strong if they triumph over it.

ilar results have been secured in many other plants by the publication of attendance and production records.

Another industrial experiment which has secured the interest of the employees in their work and in the general success of the enterprise is that of the Columbia Conserve Company, of Indianapolis.[1] This little company, under the leadership of Mr. William P. Hapgood is genuinely attempting to make itself a coöperative venture. All relatively permanent employees are put on a salary basis and paid so much a week even though they may be ill or absent. The management of the company in all matters, whether production, sales, or finance, is given to a council of workers, to which all permanent employees who attend eight consecutive meetings are eligible. All net profits, beginning with the very first dollar, are divided between the workers and the owners of capital in the ratio of one dollar of capital investment to a dollar of payroll.

The effect of this has been to increase the efficiency of the workers. In 1922, output per man hour was over 50 per cent higher than it had been five years before. Many mechanical improvements have been developed at the initiative of the workers which are in striking contrast to the paucity of suggestions offered before the plan was adopted. The council meetings bring out earnest discussion upon the fundamental problems of the business, and the members have shown truly remarkable powers of subordinating themselves to the general welfare of the enterprise. Thus they voted to demote a beloved superintendent for inefficiency, and elected a less attractive but more effective workman as his successor. The former superintendent thereupon pledged his loyalty to the group and worked to the fullest extent of his energies in the lower position in which he had been placed.

While it is true that the possibility of sharing in the profits does offer the workers as a whole a direct economic incentive to improve the efficiency of the plant, it is Mr. Hapgood's belief that this is after all only a minor cause of their interest. To his mind, the chief reason for the increased interest is that the workers have come to feel that the problems of the business are theirs to solve and that they do their best both because of the sheer intellectual interest in the problems themselves, and because they want to benefit the enterprise and the group as a whole.

2. The Motives Illustrated in the Consumers' Cooperative Movement. The consumers' coöperative movement, which has been one of the conspicuous economic successes of the last eighty years, is

[1] See my article "A Case of Genuine Industrial Self-Government." *University Journal of Business*, I, 3–22; 169–181.

rich in men and women who have worked faithfully for other motives than that of making money. The original twenty-eight Rochdale pioneers took turns in acting as store-keeper without pay, as did the members of many of the early societies. Even now the executive committees of the various local stores generally serve without pay, while the full-time managers of the various local stores received an average weekly salary in 1911 of only $9.50.[1] William Maxwell, who served as president of the Scottish Cooperative Wholesale Society from 1881 to 1908, and whose great efficiency was, in large part, responsible for building up its business to approximately forty million dollars a year, never received more than $1800 annually, while for many years he received only a few hundred a year. J. T. W. Mitchell, for many years the chairman of the board of directors of the English C. W. S., doing business at the end of his career of well over one hundred million a year, was receiving only two thousand dollars annually. When asked by John Graham Brooks how he contented himself with so small a salary, he replied,[2] "I enjoy the respect of my colleagues. I possess great power. I have a great faith in the cooperative ideal. These things satisfy me."

The salaries of the directors of the English Cooperative Wholesale Society were increased in 1920, when the annual turnover had risen to half a billion dollars, to $4250 a year![3] These salaries are only a fraction of what privately conducted enterprises find it necessary to pay to managers of similar effectiveness. The reason why the coöperative movement is able to secure competent managers for less is that it offers them other rewards than money, or as Mitchell said; "esteem, responsibility, and the service of an ideal."[4] Do not able men demand such high salaries and monetary rewards under capitalism in large part because they feel that the chief rewards under capitalism are but money? Deprived of the opportunity of serving an ideal, and of being esteemed a benefactor by the purchasers of the products which they help to supply, they must drive as hard a bargain as they can for the one thing that is given them, namely, money. The

[1] *Report on Industrial and Agricultural Cooperative Societies in Great Britain.* Board of Trade—Labor Department, Cd. 6045 (1912), xx.

[2] Charles Gide, *Consumers' Cooperative Societies* (English trans.), 6.

[3] S. and B. Webb, *The Consumers' Cooperative Movement*, 128.

[4] For the rank and file of the coöperative employees, such as retail salesmen and workers in the various coöperative factories, these incentives are not as strong as is evidenced by the rapid growth of a militant union amongst the coöperative employees which has frequently resorted to the strike as a means of enforcing its demands.

scrambling for wealth, therefore, which, to the casual eye, seems to be proof positive of the absolute dominance of the economic motive, may be largely an impulsive attempt to compensate for the absence of those non-economic ends which men really desire to serve.

V. CONCLUSIONS CONCERNING INCENTIVES TO ECONOMIC EFFORT

It may be objected that we cannot generalize safely from these illustrations, since the scientists described were unique in their non-economic motives, and since the other instances cited were also of exceptional men. Is it not still correct to assume that the mass of mankind is concerned in their business relations only with acquiring wealth with as little effort as possible, or, in other words, with getting as much for as little as they can? Not wholly. It rather seems safe to assume that since these incentives are evidenced in such a high degree by some men, they are at least present to some degree in others.

We have indeed only to look about us to see innumerable instances of men and women in their work sacrificing their apparent financial interests for some other motive. Men and women go as missionaries to foreign countries for pitiably small stipends. Men enter the ministry where the economic rewards are slight, and doctors devote a large part of their time without reward to the poor. Scientists work in Universities or in government departments upon meagre salaries while publishing their discoveries and researches freely so that all may profit from them.

Nor does the following of the non-economic motive necessarily involve the attainment of a purity of moral character which the average man regards as impossible. There are indeed the saints of science, such as Faraday, Lister and Pasteur, but a large proportion of the great contributors to science have been of far coarser clay. Humphrey Davy for example was almost pitiably vain and jealous. He engaged Faraday originally as his assistant, but on a trip to the Continent he made the latter act as his valet and refused to go to a dinner where Faraday had been invited, on the ground that a servant should not be placed on an equality with his master. He later opposed Faraday's election to the Royal Society and used all his wiles in an unsuccessful effort to defeat him.

Agassiz again was greedy for applause and for fame. He often appropriated the work of assistants with little or no recognition of their work, refusing to allow the name of his colleague, Professor Clark, to appear as a collaborator on an important study in natural

history, although Clark had completed a large share of the work involved. Agassiz not only refused to recognize Clark as a joint author, but he would not even submit the case to impartial arbitrators as Clark desired, and when Clark publicly protested, Agassiz demanded his dismissal and secured it. The shock probably ultimately killed Clark.[1]

The mistake therefore should not be made of confusing the non-commercial incentives with pure altruism although there can be but little question that the great mass of men are capable of exercising far more altruism than at present they dare to do. Upon analysis, indeed, these incentives are disclosed as extremely variegated. From the biographical analysis that has been made, one might classify them somewhat as follows:

1. The desire to benefit humanity.
2. The fascination, or joy, of the work itself.
3. The desire to project one's own personality in the work at hand.
4. The desire to be esteemed by one's fellows in the same field of activity.
5. The desire for the esteem and approval of the general public.
6. The craving for notoriety. (This may be quite distinct from the two previous incentives.)
7. The desire for power over men and over things.

The evidence seems irrefutable that alongside the economic motive, which is undoubtedly real and powerful, there are in most of us, these non-commercial incentives as well, which are, at present, utilized only to a small fraction of their capacity. It is one of the problems of our social life to offer these desires an opportunity to function for the common good and to stimulate them in that direction. The false conception of the exclusively economic man has blinded us to these other characteristics of mankind and has helped to make our age one where the emphasis is laid upon acquisition. But if we know that there are these other sources of energy in men, we can then more confidently apply ourselves to the creation of devices and attitudes which will call them forth.

[1] For the details of this unfortunate affair, see Marcou, *Life, Letters and Works of Louis Agassiz*, II, 53–5.

ECONOMIC THEORY AND THE STATESMAN

by

ROBERT LEE HALE

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ECONOMIC THEORY AND THE STATESMAN

1. STATESMEN'S LACK OF NEED FOR THEORY UNDER LAISSEZ-FAIRE

The "*political* economy" of Ricardo and his school, as its name implied, was intended as a guide to statesmen; it was concerned with problems of government. But if its conclusions were correct, it was unnecessary for the statesmen to understand the subject, provided they accepted the conclusions, for the lesson it taught was apparently extremely simple of application—merely abolish all laws which interfere with economic processes. True, governments still had to levy taxes, but certain rather simple "canons" could be laid down without drawing on any of the more abstruse portions of theory. The principal steps to be taken in the application of "sound" theory were the repeal of such interferences with trade as the Corn Laws, and the abolition of whatever governmentally-created monopolies might still exist. With these steps taken, production would flow into those channels where it would satisfy the most wants, and the distribution of wealth would be as it ought to be; for an individual's income consists of prices charged for goods and services, and in the absence of law-made monopolies, prices tend to equal cost of production (including fair profit and interest); and "costs" were identified with sacrifices. There was, it is true, a qualification to this doctrine—for goods produced under conditions of increasing cost (diminishing returns) tended to sell, not for the cost of producing the identical article sold, but for the cost of producing the *marginal* portion of its supply—the part produced at the greatest cost. As a result, those who were fortunate enough to be able to produce at a cost below the marginal, would receive an income in excess of their costs of production (including normal interest and profits). The persons in this fortunate position were, according to Ricardo, the landowners, and the excess of their incomes above cost he designated "rent." Ricardo advanced no particular reason in justification of the private receipt of this "rent"; indeed he advocated measures which, he thought, would materially reduce it—namely the repeal of the Corn Laws. But he never suggested (as J. S. Mill did later) any other change in the

legal system which would limit the power of the landlords to get "rent."

2. FAILURE OF WRITERS ON TAXATION AND TRUST PROBLEMS TO RAISE UNDERLYING QUESTIONS OF ECONOMIC THEORY

With the course of events in the nineteenth and twentieth centuries, economists came to recognize that here and there a problem emerged, the solution of which might require governmental intervention. Courses came to be given in our universities which dealt with some of these subjects where government activity was recognized as legitimate. Courses in "trusts" were added to those in public finance as standard elements in the curriculum. But after all, "trust" problems are considered independent subjects, and exceptions to the still accepted general principles that prices tend to equal costs, and that industry automatically seeks those channels where it will satisfy the most wants. In dealing with "trusts," and in raising and spending public revenues, the statesman is still supposed to need no knowledge of economic theory. Indeed it has been suggested that many of the courses in economics labelled "advanced" are far simpler than the "elementary" course and are quite comprehensible without it.[1] This might furnish no ground for censuring the curriculum were it not that problems emerge in the process of dealing with trusts and public finance, which reveal the inadequacy of orthodox theory and which still require some sort of theory for their satisfactory solution. To trace the emergence of such problems is the purpose of this paper.

3. THE NEED FOR A THEORY OF DISTRIBUTION TO APPLY TO THE TRUST PROBLEM

Why is there a trust problem at all? It is because it is recognized that the supposedly satisfactory automatic distribution of wealth takes place only under conditions of assumed competition. The Ricardian school assumed that competition would inevitably prevail if only the government would refrain from granting monopolies; and that the government ought to refrain except in the case of patents and copyrights. Not only was this the view of the economists; it was the view of the legal world as well, insofar as that world had any conscious views on the subject. Experience has taught both economist and lawyer that there are two flaws in this reasoning: first, that monopolies may exist without formal legal grant, and second, that

[1] Cf. Harry Gunnison Brown's review of Scharfman's *American Railroad Problem*, in the *Quart. Jour. Econ.* for February 1922, xxxvi, 323, at 333–34.

there are occasions when monopolies are desirable. Realization of the first fact gives rise to the enactment of anti-trust laws; realization of the second to the grant of exclusive franchises and to governmental price-fixing. Much of the popular discussion of the trust question has proceeded upon the assumption that trusts are the result of some sort of immoral conduct which should be made illegal. But the same facts which led to the grant of exclusive franchises (legal monopolies) in the case of local public utilities, have led also to a belief that many of the monopolies which have grown without formal legal grant may likewise be beneficial if subjected to proper public control. The courts in this country, as well as many economists who specialize on "trusts," have long since come to the conclusion that the anti-trust laws, even if desirable, do not in all cases furnish a sufficient solution of the monopoly problem, and that accordingly governmental price-fixing may be a desirable supplement. But neither the courts nor the teachers of "trusts" seem fully to realize that the determination of a "fair price" is not a search for some objective fact, but that it involves the adoption of a policy; and that the policy cannot be adopted intelligently without a drastic revision of accepted economic theory as well as the accepted theory of private ownership; and that the officials charged with the formulation of the policy must perforce resort to some theory as to the proper distribution of income and as to the channels into which industry should flow. Recognition of the existence of monopoly logically forces us into all these economic problems of the technique of paternalism; and it forces us also to recognize that the apparent simplicity of the lesson taught to statesmen by the orthodox economists was a delusion, since there has been one scheme of persistent and powerful, though subtle and obscure, governmental intervention, which the professional advocates of *laissez-faire* never proposed to remove: the scheme of restraints on individual liberty inherent in what we call the "protection of property."[1]

It may also be noted at this point that recognition of this scheme of intervention would alter fundamentally the courses on public finance,

[1] Thorstein Veblen pointed out in 1904 in Chapter VIII of his *Theory of Business Enterprise* that when, in accordance with the theory of "natural rights," conventional restrictions on individual liberty were abolished, "natural liberty" did not include liberty to transgress "prescriptive rights" of ownership; and that, as a consequence of this remaining restriction, combined with the development of the machine process of industry, sufficient pecuniary pressure could be exerted by some to force others to abandon any *de facto* freedom of action.

and would reveal the fact that those courses too require some theory as to the proper distribution of incomes and the channels into which industry should flow. The reasoning by which the authorities on finance have succeeded in avoiding these problems, thus keeping their skirts apparently unspotted by paternalistic heresy, will be brought out subsequently. Let us first see how the problems of price regulation raise issues deeper than is currently supposed.

4. THE PROBLEM OF A "FAIR PRICE"

What is a fair price? The United States Supreme Court has occasionally expressed the naïve theory that a price is extortionate if it exceeds what the service is "worth." Orthodox economic theory, with its distinction between "value in use" and "value in exchange," was quite adequate to display the untenability of this theory. The price cannot fail to exceed what the service is "worth" (in the sense of "value in use") to some who might otherwise buy; and it cannot very well exceed what it is "worth" to those who do buy if they be considered the best judges of their own wants. And the price cannot fail to equal the "value in exchange," provided only that there is *some* market at the price charged, and that all who wish to buy can be served.

5. THE TEST OF A "FAIR RETURN ON A FAIR VALUE"

But even the Supreme Court never put much stress on the test of "what the service is worth." Whether the entire rate schedule of a company is "extortionate" is usually held to depend on whether the return yielded by those rates constitutes a "fair return on the fair value of the property devoted to the public use."[1]

This test seems at first blush to conform to the classical theory of the economists that under competition a price tends automatically to

[1] This test was laid down by the Supreme Court to determine whether the rates fixed by a state were unduly *low*, and thus in violation of the company's constitutional right not to be "deprived of property without due process of law." Statements were frequently made to the effect that when the *reduced* rates were held to be constitutional ("non-confiscatory"), it did not follow that the rates charged before reduction were "unreasonable." These statements implied that the test of "reasonableness," to be applied by a commission, differed from the test of constitutionality, applied by the Court. In fact, however, the commissions have gone through the same processes as the courts, as pointed out in the extremely able minority opinion of Justice Brandeis (concurred in by Justice Holmes) in *State of Missouri ex. rel. Southwestern Bell Telephone Co. v. Public Service Commission*, 43 Sup. Ct. 544, decided May 21, 1923.

equal the cost of production, including fair interest and profits. In the absence of competition, it seems to be thought, regulation should bring prices into conformity with this "natural level." By this test an "extortionate" price was no longer thought of as one which exceeded the value of the service. This test does not ignore the fact that any valid complaint against a price charged by a company must show, not that the price exceeds the exchange value of the service, but that the value itself is too high. By this test, the company is no longer thought of as entitled to base its price on the value of the service, which may itself be but the symptom of the company's "extortion." Instead it is supposed to be entitled to maintain the exchange value of its *property* unimpaired; and this is to be attained by permitting it to charge such rates, and such rates only, as will yield a fair rate of return on this value.

6. VALUE OF PROPERTY DEPENDENT ON RATES CHARGED

But this test is quite as illusory as that of "the value of the services"; for, as will be pointed out at once, the exchange value of the property used in producing the service is quite as much the result of the price charged as is the value of the service itself. It follows that the exchange value of the property may equally be a symptom of "extortionate" rates. The entire assets of a company will sell on the market for just such a sum as that on which the market anticipates that the company will be able to earn a "fair rate of return" in the future—meaning by a "fair rate" such rate as the market fixes on money invested under conditions where the risks are thought by the market to be similar. True, any particular portion of the physical property may have an exchange value no greater than the cost of substituting other property equally efficient as a producer of earnings; and true, the sum of the values of all the portions of the physical property, judged in this way, may in particular cases fall short of the sum on which the company is expected to earn a fair return. But if that is the case, the difference between the sum on which a fair return is expected and the cost of replacing the physical property will be set down as "intangible property"—"good-will," "franchise," or "going-concern value." This "intangible value" will so swell or shrink with changes in the anticipated earnings as to make the statement still true that the value of the *entire assets* is a result of the anticipated earnings. But what if the cost of replacing the existing plant with an equally efficient substitute exceeds the amount on which a fair return is anticipated? Will not the value then be something in excess of and independent of the "earning-

capacity value''? Brief consideration will show that it will not. While nobody would pay for a piece of industrial equipment a sum greater than that for which he could secure another equally efficient piece, it by no means follows that he will pay as much; he will not pay more than a capitalization of the earnings he anticipates from its ownership. Perhaps it would be more accurate to say that since the ''efficiency'' of the property is an efficiency in making money, one can always buy property ''equally efficient'' by investing in something of similar risk which is expected to yield the same return, and that the amount one must invest to secure this return is precisely equal to a capitalization of the earnings anticipated from the property in question.[1]

The only case where the physical property of the regulated concern can have an exchange value greater than the sum on which the anticipated earnings constitute a ''fair return'' is a case where this property can be sold to other users whose returns may be greater. But if this can be done, it is likely to be done, and the utility company will not long own property worth more than its earning capacity. If there is an effective obstacle to such sale of the physical property—whether that obstacle consists of legal prohibition, or physical alteration unfitting the property for other uses, or such injury to the remaining plant as will more than offset the advantages of sale—then the property does not possess this sort of exchange value.

7. Question whether present value is itself excessive

In short, whatever the circumstances, the exchange value of the total assets of a utility company will be the result of its earnings, which in turn will depend, in part at least, on the action taken by the regulating authorities. The problem of distinguishing between rates that are ''extortionate'' and rates that are but ''reasonable,'' then, raises the question, not whether the earnings yield an ''excessive'' or a ''proper'' rate of return on the ''value'' of the property, but whether the value which the property now has is itself ''exces-

[1] This is a mathematical truism, too familiar to require more detailed explanation. If the reader is skeptical, he is invited to sit down with paper and pencil and work it out for himself, assuming any rate of interest he finds convenient, and remembering that, since the risk in the substitute investment is taken to be the same as in the actual one, the rate of return in the two will be identical. It cannot but follow that the same amount will be offered, and obtainable, in the market for the utility property in question as for any other property of similar risk promising the same return, in other words for "equally efficient" property.

sive'' or but ''reasonable.'' For in regulating the rates we are regulating the value. If the rates are adjudged ''extortionate,'' it must follow that the value of the property has become greater than it ought to be.

By what test, then, can we determine whether the value which the company's assets now possess is ''excessive,'' or ''reasonable'' or ''too small''? To what should this value be made, by regulation, to conform? Let us turn once more to orthodox economic theory and see what is supposed to happen under competition. Do the returns of competitive industries automatically secrete, for the assets of the industries, values which conform to some ''natural'' level? Do the values of ''capital goods'' tend to conform to the costs of producing those ''capital goods'' or do they tend to conform to some other ''natural'' law, or do they merely result haphazard?

8. ACCEPTED ECONOMIC THEORY AND THE VALUE OF CAPITAL GOODS UNDER COMPETITION

If the exchange values of consumers' goods conform to costs, does the same reasoning apply to the exchange values of durable producers' goods? This involves us in a brief restatement of the orthodox reasons for supposing that the values of consumers' goods conform to costs. However useful any particular kind of thing may be, its exchange value is supposed to fall (other things remaining equal) if the supply increases. This is because the sellers have to find a market for the additional quantity among people who want it less than the buyers of the smaller supply, or among people who have less money, or among the same buyers for less pressing purposes. If the price happens to exceed cost (including interest and profit), capital, labor and managerial ability will be drawn from other channels to take advantage of the excessive profits in the production of this commodity; the supply will thus increase and the price fall. This will go on until the price drops to cost. An equilibrium will be established at which a larger quantity will be produced than before and sold at ''cost.'' The ''cost'' must refer to the amount of money essential to serve as an incentive to induce production; it includes actual expenses for raw material and the like, payment for the use of equipment and land (or else interest on what the producer pays to buy the equipment and land) as well as ''wages of management.''

What determines the price which the enterpriser must pay for the use of his land and equipment? If the supply of these things be taken as fixed (or at any rate as not responsive to changes in the prices obtainable for their use—the assumptions Professor J. B. Clark

makes in his "static state"), let us suppose that the demand for their products increases without increase in the expenses of producing them (other than the price paid for the use of this equipment). The first effect would seem to be to make the price of these products rise above the cost of producing them. Will more products be produced until the added supply brings prices down to the previous level? Not if the supply of equipment is fixed; for with the same equipment, additional output can be obtained, but only by a more intensive use of the equipment, which implies a higher cost for the marginal units; and the price will not go permanently below the marginal cost of a somewhat increased output. But the higher price will apply to all the units of the product, the higher cost of manipulating the equipment only to the *additional* output. The result will be a higher gain to somebody, due to the physical obstacle to the increase of production, an obstacle to the working of "perfect" competition. But the gainers will not be the enterprisers as such; they will be the owners of the limited equipment. The "imputed productivity" of the equipment will have increased. Enterprisers will bid against one another for the use of the equipment in order that they may obtain the unusual profits involved, and the process will go on until the unusual profits are all absorbed in greater rents paid for the equipment, which will result in greater values for the equipment also. Such is the theory. It is not, of course, Ricardo's theory, but the version of the more modern orthodox economists. I believe it is an accurate statement, for instance, of Clark's views. It will be noted that the basis of distribution on this theory has shifted from the earlier basis of "sacrifice" to that of "imputed productivity," a basis which Clark expressly approves as "ethical," but without any discussion of the grounds.

The foregoing makes one assumption (among others), namely, that the supply of equipment is affected only by "dynamic" causes—that is, that in the "static" state it remains fixed; in other words that it does not alter in response to any changes in the prices obtainable for it. This assumption is explicit in Clark, but is repudiated by some other modern economists—notably Taussig, in respect to "capital goods" as distinct from "land." The assumption is clearly not wholly true. If the value of durable capital goods is raised, by a change of demand such as that supposed in the preceding paragraph, so that their value exceeds the cost of producing more, will not more be produced? And, if as a result of an opposite course of events, the value of capital goods is reduced to less than the cost of

replacing them, will not the supply gradually diminish as they wear out and are not replaced? If we apply the reasoning of economic theory consistently, will not the supply of artificial durable capital goods increase or decrease if their temporary value happens to be above or below "normal," precisely as the supply of finished goods is supposed to increase or decrease? If so, will a change in the supply of the capital goods alter their market values and bring them into conformity with some "normal value" as in the case of finished goods?

There seems to be as much reason for supposing that the values of durable producers' goods vary with the supply as for supposing the same in regard to consumers' goods, though the reason is not precisely the same. To use Clark's terms, it is because of the law of diminishing productivity, instead of the law of diminishing utility, which applies to consumers' goods. If there are more capital goods, they will have to be used for purposes of less physical importance—i. e., combined each with a smaller quantity of other productive factors. This is the same as saying that each durable good of the kind in question will be used less intensively, and the difference between the cost of manipulating it to bring forth its marginal product, and the cost of bringing forth its intra-marginal products, will be less. Clark has pointed out a certain similarity between the "rent" of land and the "rent" of other durable equipment. Its "rent" will be less, for all of its products will be nearer the margin than before. Moreover, the margin may be pushed back for another reason—the total supply of the products of this sort of equipment, as a result of the increase in the equipment, will increase, and the price will drop. Such are the reasons for supposing that an increase or decrease in the supply of durable capital goods will lower or raise their market values (by altering the "rent" of each such good). I am not asserting that this reasoning is conclusive. It is possible that it is fatally defective in ignoring the effect of greater general productivity in raising demand and counteracting any tendency for prices to decline when products increase. But at any rate it seems quite as valid for durable producers' goods whose supply changes in response to price as it is for consumers' goods. The attempt is to see what accepted theory, taken on its own terms, but amplified and made more consistent, can offer us by way of a "norm" to which we shall make the value of the assets of regulated companies conform when we regulate their rates. If it offers nothing, then a more adequate theory must be sought.

9. VALUE OF DURABLE CAPITAL GOODS AND COST OF REPRODUCTION (LESS DEPRECIATION)

It would seem to be a corollary of the accepted economic theory outlined above that under conditions of supposed perfect competition the value of reproducible durable capital goods will tend to equal the cost of reproducing those goods, minus accrued depreciation.[1] If temporarily higher, more of such goods will be constructed, and their values decrease; if temporarily lower, then, when worn out, the goods will not be replaced, and, with diminishing supply, their values will rise. Thus, under perfect competition, not only do the prices of finished goods tend to equal the cost *to the enterpriser* of producing them; they tend also to bring about such an adjustment of his costs as will bring the prices of durable producers' goods into conformity with the costs which *their* manufacturers incur in reproducing them (less depreciation). But this is not all.

10. VALUES OF LAND AND CAPITAL GOODS ABOVE COST A SYMPTOM OF IMPERFECT COMPETITION

If orthodox economic reasoning would allow values of capital goods to equal their reproduction cost (less depreciation) even when that exceeds the actual cost of producing them, and would allow land (which cost nothing to produce) to have a value, what becomes of the theory that "perfect competition" brings about values equal to costs? There seems to be a rift in the economic lute. I believe it is the same rift, at bottom, as that which led Ricardo to the view that the value of goods produced under conditions of increasing cost tended to conform, not to the average cost of all the products, but to the marginal cost. The truth is that "perfect competition" does not step in the moment "perfect monopoly" is eliminated. The excess

[1] The deduction of depreciation is accounted for by the fact that the reasoning applies, strictly speaking, to the cost, at the time, of producing another durable good equally efficient as a yielder of net earnings. To ascertain net earnings, one must deduct from the gross, not merely current operating expenses, but a sufficient amount *per annum* to provide for the replacement of the goods when worn out. If the good is new, a smaller sum can be deducted each year than if old, unless the owner of the old has already been accumulating a sinking fund. But the owner of an old good without a sinking fund, has a lower *net* earning capacity than the owner of a new one. If an old durable capital good were earning a fair return on its replacement cost *without* deduction of accrued depreciation from that cost, a new good (having to deduct less *per annum*) would be able to earn more than a fair return on its present cost of production; and such a situation, under supposed perfect competition, would last only until sufficient new goods could be produced.

of reproduction over production cost of an artificial capital good, and the value of land (itself the result of Ricardo's "rent"), are symptoms, I believe, of the *imperfectness* of competition. The "price equals cost" formula was based on the assumption that if one obtained more than cost, others could add to the supply until the price fell to "cost." Yet the price of finished products may be much higher than the cost *to some producers* of producing their goods, without inviting additional supplies, provided only the price is no greater than the cost of producing at the margin. So much Ricardo saw. But is not that the same as saying that, while there is not complete monopoly, still competition is prevented from doing its perfect work by the scarcity of natural resources? In other words, the owners of the superior resources are subject to some competition, but to competition of others who lack the same opportunities. And it is this lack that accounts for the receipt by the former of the "excess of price above cost," the "rent"; and the "rent" accounts for the value of the land. Likewise if the cost of producing artificial equipment goes up, the owners of existing equipment are subject to competition only of handicapped competitors, who cannot afford to produce at a price which the original buyers of equipment can afford. Were competition "perfect," then, there would be no excess of reproduction cost over the actual cost of equipment; and land would have no value whatsoever (except so much as equals whatever it may have cost to clear it, etc.).

11. "OPPORTUNITY COSTS" AND SOME OTHER COSTS WHICH DEPEND UPON EARNINGS

We must beware, at this point, of a verbal difficulty which seems to refute the above reasoning, including Ricardo's analysis of a price which exceeds cost. In our analysis of a "normal" price for reproducible capital goods, we saw that *from the point of view of the enterpriser,* the payment for the use of such goods is a "cost," though its amount will vary with the profitability of the use of the *marginal* good of any one class to its hirer. Similarly, if the owner of the equipment can obtain a given amount for the lease of that equipment for one purpose, that amount is, from his point of view, a "cost" below which he is not likely to lease it to another. It is what Professor H. J. Davenport calls an "opportunity cost." If "opportunity costs" be included, it can be demonstrated that the price can never exceed cost. But this is a truism inherent in the definition. An "opportunity cost" is like a ghost which vanishes on being boldly confronted. Destroy the opportunity, and the cost vanishes. A cer-

tain piece of land, for instance, is capable of yielding an annual net rental of $1,000. It would involve a "cost" of $1,000 to the owner to use it for his own production, and it will be contrary to his interest so to use it unless the product will sell for $1,000 over and above all other costs. But tax the land $1,000 a year, and the "cost" of using it in his own production will not increase, for the "opportunity cost" is gone, and the cost of paying the tax is no greater than was, previously, the "opportunity cost." This vanishing quality does not pertain to other than "opportunity costs"; if the other costs cannot be met, they do not for that reason shrink, and the production will not take place at all, if the producer follows his own pecuniary interests. Hence the distinction made by Ricardo is sound enough, as far as it goes, though some would prefer the statement that produce raised on the better lands sells at a price which exceeds *costs other than opportunity costs.* And if it is produced on hired land, it might be better to say that its price exceeds *those costs which do not depend upon the price itself.*

Yet an "opportunity cost" will not necessarily shrink with a shrinkage in the earnings from the production of *any one commodity.* Take, for instance, our land in the illustration given in the previous paragraph. If it will yield still $1,000 rent when devoted to the erection of a shop, there will be a "cost" of $1,000 a year in the use of that tract for a market garden, whether or not the earnings from garden products exceed other costs by that much. If a tax of $300 were imposed on its use as a market garden, it would be withdrawn from such use and a shop would be built, unless the price of garden products were sufficient to include the tax *as well as* the $1,000 obtainable from the shop. It is only when the tax attacks the "opportunity" on all fronts that the "opportunity cost" will shrink. It may be that many items which figure as costs to the enterpriser today, and which do not shrink when the surplus of earnings above other costs shrinks *in any particular* industry, are none the less "opportunity costs" from the viewpoint of industry as a whole. To invest one's money, for instance, in a given industry, involves the "cost" of whatever interest that money might earn in other investments of similar risk. Reduce the opportunities to receive interest, or earnings which in the economic sense amount to interest, *everywhere;* will it follow that the cost to enterprisers of obtaining funds with which to buy equipment will diminish? Very likely not, if it is true that the formation of capital depends primarily on "savings" of investors, rather than on transactions of banks and reinvestments of corporate sur-

pluses,[1] and if it is true in turn that a considerable amount of the savings now made would not be forthcoming at a lower interest rate. Yet to those who would invest for less *were it impossible to obtain more,* a part of the interest they receive is an "opportunity cost." Such cost cannot be reduced by regulating the rates of utility companies, because this process will fail to reduce the investors' opportunities all along the line. Taxation of the "intramarginal investor" in every investment he may make is the only effective method of reducing this particular "opportunity cost," and this method depends for its success on the doubtful possibility of singling out those investors who are wholly "intramarginal." Meanwhile, it may be noted that the existence of this "savers' surplus" is a symptom of the absence of perfect competition—the marginal investors competing with the intramarginal at a greater cost in terms of sacrifice.

If we are to try to make regulation affect the assets of the regulated companies in the same manner as that in which "perfect competition" is supposed to affect the value of other assets, we shall reduce them to an equivalent of what it originally cost to produce (not to buy) these assets, with nothing for land, though the company may have paid liberally for that. The result seems drastic. Since "perfect competition" is absent from a large field of industry, should we not perhaps try to substitute the standard of what is "normal," whether or not there is "perfect competition"? Here we strike the difficulty that, in economic theory, there is no "normal" outside the field of perfect competition. Values of capital assets may be found to range far below cost to far above. It is only under "perfect competition" that they equal cost. With so much variation, where is our standard?

12. Absence of a standard intermediate between monopoly and perfect competition

It may be said that since, outside the regulated field, values tend to equal *reproduction* cost, including the cost of *buying* (not strictly "reproducing") land, the same standard should be adopted as a guide to regulation. Let us see where this standard leads us. We should have to include "intangibles" as well as "physical values." Many an unregulated business has assets worth more than the cost of reproducing (and re-buying) its component physical elements. This extra value is called an "intangible," and it is based on earning power. To add the "intangibles" to the values of the separate

[1] On this point see G. A. Kleene's very significant article, "Productive Apparatus and the Capitalist," *Jour. Pol. Econ.*, xxxi, 1, February 1923.

physical units is to reach the value which the *total* assets have already; and to use regulation in such a manner as to make the value of the whole conform to what it now is would obviously be futile. Yet there is no more logical reason for squeezing out the intangibles than there is for squeezing out the increment in the physical values above actual costs. Both are alike symptoms of the absence of perfect competition.

13. OBJECTIONS TO MAKING VALUE CONFORM TO COST BY PRICE REGULATION

Yet there are objections to the elimination by price regulation of all values which exceed cost. And some of these objections raise the question whether all the results supposed to follow from perfect competition would be desirable.

14. FALLACY OF THE PRINCIPLE OF EQUALITY OF LEGAL TREATMENT

We need waste no time over the contention that as long as unregulated persons still enjoy such "surplus values," some principle of equality of treatment requires us to allow regulated persons to enjoy them. The brief answer to this is that equality of legal treatment is entirely impossible, and that since the more numerous portion of the community gets none of these surpluses, it is no greater violation of "equality" to put the regulated persons into the class with the more numerous than it is to leave them in the class with the less numerous.[1] This particular objection is untenable. But there are others which have weight.

15. NECESSITY OF COMPENSATION FOR LOSS OF AN OPPORTUNITY IN ANOTHER FIELD—LAND INCREMENT

One objection bears a somewhat superficial resemblance to the foregoing. It has already been observed that what is an "opportunity cost" from the point of view of industry as a whole may be a true "incentive cost" in a particular industry. Could we abolish the opportunity, the "cost" would disappear with it. But in regulating the prices of particular industries, this is what we cannot always do. Thus, even if it be conceded that all land value (subject to a few qualifications) is a reflection of income which is purely "opportunity cost," and a symptom of imperfect competition, still we could not abolish all income which gives rise to land values in the

[1] For a fuller demonstration see my "Rate Regulation and the Revision of the Property Concept," *Columbia Law Review*, xxii, 209, at 212–213, March 1922.

case of regulated companies, without disaster. It is true that if the single taxers were given full reign to tax all economic rent of land a hundred per cent, land could be obtained (subject to the tax) for nothing. But as long as the rent is obtainable outside the regulated field, its payment is a "cost" to the regulated industry which must be met if the regulated industry is to go on. A railroad cannot be built without land. Under present constitutional limitations land cannot be obtained (I am ignoring free governmental land grants), whether by eminent domain or by voluntary purchase, without paying the owner its value. Its value depends on the earnings (and perhaps part of the increment) anticipated in uses outside of the regulated field. A return sufficient to add this amount of value to the cost of the other assets of the railroad is an irreducible part of the cost incurred by the company, as long as the opportunities for the land owner exist elsewhere. For the same reason, even if it be true that a general tax on interest ("imputed" interest as well as interest on loans) would not reduce the supply of equipment—if interest in other words, is wholly an "opportunity cost" for industry as a whole —it would still be true that interest on public utility investments alone cannot be wiped out by regulation as long as the opportunity to earn it elsewhere remains. It does not follow, however, as is sometimes asserted, that land will not be devoted to utility properties unless the utility is allowed an increment equal to that which would accrue in the unregulated field. Land can be bought by a railroad company for *some* price, and the money wherewith to buy it can be obtained from investors if a sufficiently attractive rate of return is offered without any increment whatsoever. True, this necessary return is apt to exceed in amount what the land owner is getting on his land, but this is because the investor's sole reward is the annual return, while the landowner was parting not only with his current earnings from the land, but with his prospective increment as well. The railroad customers in effect have to pay the landowner for his "opportunity cost" of a chance to gain an increment, but they pay it when they pay to the investors the full current interest rate (considering risk) on the amount which the investors, through the medium of the corporate treasury, paid the owner. True, the patrons of the railroad could be made to pay the opportunity cost in a different manner—by paying less than the current rate to the investors at present, but enough more in the future to give the investors an increment, should circumstances warrant. Such a method may perhaps be the only practical method of obtaining capital under conditions of early risk succeeded by a decisive certainty one way or the

other—conditions to be mentioned presently. But to pay both the full current rate now and sufficient later to give the company's property an increment is, to pay the "opportunity cost" twice over.

16. "VESTED RIGHTS" OF BONA FIDE INVESTORS

Another objection to the removal by regulation of all "surplus" values is the following. People who buy securities of a prosperous company pay a price based on the anticipated earnings. If this price exceeds the original cost incurred by the corporation, it is a symptom of imperfect competition. But the recent buyer of the security has parted with his money in reliance on the continuance of the obstacle to perfect competition, an obstacle for which he was in no wise responsible. The "cost" to him is greater than it need have been had perfect competition always prevailed, or had the income always been made artifically to correspond with that which perfect competition would have produced. But such is not the case. What may have been but an "opportunity cost" to the original stockholder has become part of the actual cost to his successor. He would not have invested his money—as much of it—without the prospect of a return on all of it. In order to get the concern going it was important that the securities be made readily transferrable. While this would have been accomplished had the return *always* been kept down by regulation, so that the new buyer would have bought his stock for original cost, the fact is that the stock was not in fact transferrable to the new buyer except on payment of its new and increased value. From this point of view, to reduce the value to less than he paid is to reduce it to less than cost. Yet to keep the value up is not only to defeat all regulation but to give the previous investors who invested the smaller sum, a value above cost. The dilemma is not wholly avoidable where the values above cost have already materialized. It can be avoided in the future only by some scheme of regulation which will prevent values growing above cost hereafter. As for the past, the whole problem of the justification of incomes which represent money invested in good faith, raises a nice question of economic ethics, and one not usually discussed with adequacy in economic treatises. Where a particular income is sought to be justified, not because it serves as an incentive, but solely because its recipient paid its full capitalized value in good faith, it is suggested that the merits of the justification depend in part on whether there is enough income in society to satisfy necessities which may be more pressing than those of the holders of the "vested rights," and in part on political

considerations of how far concessions to "vested rights," may facilitate other items in a reform program.

17. INCREMENT AND RISK

A third objection to the regulation of values into conformity with supposed costs, is that at times the money paid for the property by the corporation does not fairly represent all the cost incurred by the security-holders. Where the initial risk is great, the compensation may take the form of a higher, continuous rate of return, sufficient to keep the value equal to the amount invested. But if the great early risk soon lessens, as was suggested above, and if the rate of return then allowed is only sufficient to keep the value equal to the amount invested, the investor will then have been asked to take the risk of a few years of great uncertainty, with no greater reward than if he had invested in a perfectly safe undertaking. To attract capital in such cases might require the chance of enjoying an increment in case of success. Such increment above the *money* invested, however, would equal the market value of the *risk* incurred.

18. INCREMENT AND EFFICIENCY

An objection somewhat similar to the above arises owing to the necessity for giving a pecuniary stimulus to efficiency. If efficient management is to result in higher net earnings, it will likewise result in increased value for the securities. The security holders will be rewarded not only for their own contribution of capital, but for the officers' efficiency of management. They, or their representatives, may therefore be supposed to be more careful in the selection of capable officers, and the officers more on the alert to win promotion. Experience with "cost plus" contracts in the war, as well as a great deal of public utility and railroad experience, shows the danger of padding expenses and of paying high prices for supplies to companies in which the management or the financial backers may be interested, when the officers have no direct or indirect pecuniary interest in the efficient and economical management of the company. Fraud must be very gross in order to be detected by the regulating authorities; and it is not alone fraud but laziness which has to be overcome. "Sliding-scale" arrangements have been tried in order to stimulate economy, but experience is not sufficient as yet to justify any very satisfactory conclusions. One difficulty with all such methods is the danger of stimulating the wrong kind of economy. It is doubtless economical, for instance, from the point of view of the management, for the New York subways to keep their trains unheated in

winter; the effect on the health of the community is another matter. It may be that it is not pecuniary stimulus so much as the inculcation of a new spirit in managers that is wanted—a spirit of pride in their work and a transference of their loyalty from the stockholders to the public. At any rate, if carefully safeguarded increased payments to security holders should be thought essential, some scheme for effectuating them can be engrafted on to whatever scheme may be essential for securing capital, without altering our conclusions as to the latter. The problem calls perhaps for experience rather than for economic theory.

19. JUSTIFIABLE RATES WHICH YIELD UNJUSTIFIABLY HIGH EARNINGS—RATIONING—"RECAPTURE" OF EARNINGS BY TAXATION

An objection of a different sort presents itself in some cases to the proposal to bring the value of the property into conformity with its cost through the process of regulating the prices charged for the products. It is an objection which requires a modification of the proposition that the reasonableness of rates is to be judged by the earnings they yield and by the consequent values they give to the assets. Should a rate ever be raised when the earnings are satisfactory, in order solely to cut down the quantity of service called for? Frequently a natural gas company or an irrigation company renders a service the supply of which it is impractical to expand. Frequently a rate which would give the company's assets a value equal to cost would be a rate at which a much greater quantity would be demanded than can be supplied. If such a rate is charged, many who would like to buy at the price will find themselves shut out. The company must either play favorites, or adopt the rule of "first come first served," or ration the supply in some manner. If the rate is kept low, there is as much reason why the rules of rationing (of "priority") should be formulated by some responsible government body as there is why any other rules of law should be. During the war, governmental bodies devised priority rules for the purchase of many articles—from sugar to steel. Even in peace times, the Interstate Commerce Commission spends no little time in rationing coal cars among the various coal-mines, and state commissions frequently decide who shall be entitled to share in the limited service of irrigation companies. What light does economic theory throw on rationing?

According to accepted theory, there is one proper way of rationing, and that is the way which apparently defeats (in cases such as those suggested above) the possibility of regulating prices in such manner

as to bring the values of assets into conformity with costs. That way is to raise the price until the quantity demanded no longer exceeds the supply. This is to give priority to those who are willing to pay the most for the service. It will give the company's assets a value above cost, for it will obviously increase the net earnings above what they would be at the lower rate, since the higher price will not be offset by smaller sales. After, as before, the rise, the company will be selling all it can produce.

This method of rationing was that which orthodox theory assumed to take place outside the regulated field, and it was one of the special merits claimed for the so-called system of *laissez-faire*. By making the unwarranted assumption that the relative desires of different purchasers correspond to the relative amounts of money they are willing to pay (ignoring the fact that the rich man's willingness to spend a dollar implies a much weaker desire than does the poor man's), it was made to appear that the limited supply of any commodity would be utilized for the satisfaction of the most pressing wants for it. Not only is it not true that sales to the highest bidders necessarily result in satisfaction of the most pressing wants; it is not even true that the sales of unregulated concerns are always made to the highest bidders. Many concerns keep their prices at certain figures, from reasons of business policy, and do not lower them every time the supply is unsold, or raise them every time their orders cannot be filled. The news of the business world, in times of activity, is full of accounts of unfilled orders. Concerns producing machinery and raw material in such times favor their regular customers and defy the economic law that the price always reaches quickly a point where demand equals supply. Is not this perhaps one explanation of the growth of the "vertical trust" movement? Is not the desire of the manufacturer to produce his own raw material based at least in part on a fear that otherwise, in periods of activity, he may find himself unable to obtain his raw material even though he offers to pay the established price?

The importance of the failure of prices to equalize supply and demand seems to be growing in the modern world. A large part of the international conflict over the sources of raw materials, oil and the like, seems to be based, not alone on the desire of particular exploiters to reap the profits, but on fear that the "nationals" of one country may be excluded altogether from buying in case of shortage. Such a situation would not arise did rationing take place solely in accordance with the "economic" method of so fixing the price as to cut off the excess demand. Economic theory requires

correction and expansion to explain the results and motives of private priority regulations, as well as those adopted by governmental bodies —those adopted by rate regulating commissions, and those affecting the access of foreigners to natural resources.

Meantime, as indicated, a regulating commission may find it better in many cases to adopt the simpler method of rationing which consists of raising the price. In that case, those who obtain the limited supply will not necessarily be those who wish it most intensely; but the method has the merit of inducing the favored class to part with a portion of their spending-power. This is a merit provided the spending power is transferred to the general public or to some part of it more in need than the class of wealthy buyers. The merit is not achieved, however, by letting the stockholders of the regulated company enjoy the excess earnings which result from the higher rate. It will be achieved only by making the corporation a channel through which the money of the buyers will be transferred either to the government for the benefit of "the public," or to the consumers of some other class of service rendered by the company, at rates below cost, or to the company's employees in the form of higher wages. There is no reason to suppose that it is more desirable, socially, to favor the employees of this particular company or the consumers of other products of this particular company, than to favor other classes through the channel of the government treasury. It may, however, be easier politically to reach either of these classes than to distribute the benefits more widely.

Let us examine, however, the proposition to have the excess earnings which result from the higher rates transferred to the public treasury. Such is the plan adopted, in part, in the Transportation Act of 1920. The rates under such a scheme, it will be noted, are fixed above "cost," or at least are fixed above the point where they yield that sum to which, for whatever reasons, we think the company properly entitled; then the "cost" is raised correspondingly by making the company pay to the government the surplus. The rates equal the "cost" incurred by the company just as much as if they were fixed on that basis, but the adjustment is brought about not by regulating rates downwards but by regulating cost upwards. The proceeding before a commission would be roughly as follows. First see if the company's earnings are excessive. If so, next ascertain whether rates which would yield nonexcessive earnings would cause demand to exceed the supply which it is practicable to furnish. If not, reduce them. Otherwise the next step is to decide whether it is practical to adopt satisfactory priority rules. If this is decided in

the negative, then fix rates at the point where demand and supply will equal each other, and "tax" the rest of the earnings. Under such a scheme, the earnings yielded would not be a conclusive test of the reasonableness of the rates. The other facts would have to be examined to determine whether the conformity of value to cost (or to such modification thereof as should be adopted) should be brought about by price regulation or by "taxation."

20. DOES A "RECAPTURE" PROVISION BURDEN CONSUMERS FOR THE BENEFIT OF THE GENERAL PUBLIC?

Suppose that the application of this scheme were to bring in a large part of the public revenue, could it be said that the regulated companies or the consumers who pay the rates are being burdened for the benefit of the rest of the community? Such an assertion would doubtless be made, but it is difficult to see how it can be supported. As far as the companies are concerned, it can obviously make no difference to them or their stockholders whether their earnings are kept down to a prescribed level by rate reduction, or by taxation. As for the customers, it is true that they are paying rates, for the benefit of the "public," which exceed what they would pay were the rates kept down to "cost" and no payments made to the government. That is, from the economic point of view of all industry, not merely of the company which pays the "tax," the cost of producing the service does not include the tax, and thus the consumers are paying not only the cost of producing the service, but an additional payment to the government. This additional payment corresponds to no cost incurred by the government. According to the classifications of some writers, this payment by the consumers of a price which exceeds cost is not, properly speaking, a "price" or a "fee," but a "tax," and is hence to be justified only in case the class which pays it has a greater "ability to pay" than other classes, or else in case other classes of similar "ability" are subjected to similar taxes from which this class is exempt. But in just what manner does this arrangement "burden" the consumers in comparison with any other classes? Suppose the price were lowered to cost. It must be remembered that we are speaking only of cases where it is not practicable to increase the supply. The result would be that all orders could not be filled. Those who consume under the proposed arrangement might or might not be permitted to consume were the rates reduced. The arrangement under the reduced rate would obviously discriminate in favor of those who obtained priority. If one would-be buyer at a given price is allowed to buy and another

is not, there is obvious discrimination, whether justified or not. Where the price is raised till no would-be buyer is excluded, although the arrangement may be said to discriminate in a sense against those whose wants cannot be satisfied because they cannot afford to buy at the high price, it is clear that there is no discrimination against those who do buy. They are as well off as if not allowed to buy, and some of them or others would be in the excluded class were the price lowered. It is only if the price were raised *above* the point necessary for equalizing supply and demand that the arrangement could be said to discriminate against the buyers. In that case, since another arrangement would be possible which would enable these buyers to satisfy their wants at less cost without forcing some of them outside the priority barrier, the failure to make that arrangement might be called discrimination. But where any reduction in price would bring out a demand which must remain unsatisfied, the payment of that full price is the only thing that prevents the arrangement from discriminating *in favor* of a select group of buyers—if even that arrangement prevents a favorable discrimination in the broad sense suggested above. If, then, the payment of this price (which, being above cost, enables revenue to flow to the government) is not an arrangement which discriminates against this class as compared with others, it cannot be said to be a "burden" on one class for the benefit of the general public. The benefit to the public results necessarily unless a special discriminatory benefit is to be conferred on a selected class of buyers (selected by priority regulation), or handed as a gift to the stockholders of the regulated companies.

21. WOULD ARGUMENT AGAINST "RECAPTURE CLAUSE" LEAD TO EXEMPTION OF ALL BUT LAW-MADE MONOPOLIES FROM REGULATION?

The latter course is advocated by some. It would doubtless be admitted that the company would be no worse off to lose its revenue by taxation than to lose it by rate reduction. But the argument takes the form that the company may have to yield something for the benefit of consumers which it ought not to lose for the benefit of the general public. If it is reasonable to charge the customers a given rate, it is said, it must be reasonable for the company to keep it. This argument is based on a narrow and legalistic view of the whole situation which calls for price regulation as a remedy. The situation is not necessarily that the owners are charging more than is moral, or that they are committing an immoral act in restraining competition or in limiting output. They may be doing these things or they may not. If the supply is limited through no fault of the

owners, but by reason of natural conditions, there is the same ground for preventing the owner from getting the sole benefit. Yet were he merely to charge less voluntarily he would not materially improve the situation, for, with the supply limited, he would merely transfer the special benefit from himself to an equally select group of consumers. He is doing nothing immoral or anti-social in collecting the price he collects. Nor is he collecting it necessarily by virtue of any special monopoly formally granted him by the government. He is collecting it by virtue of his rights of ownership. The argument of the opponents of the government "recapture of excess earnings" is based on the assumption that whatever a man collects by the exercise of property rights he should be permitted to keep. It is an argument which lacks the support of the justification given by the classical economists to the so-called system of *laissez-faire;* for in these cases the price clearly exceeds cost. It is an argument which would equally justify exemption from regulation altogether where the company's power is not based on a formal grant of monopoly. It is an argument which fails to scrutinize closely the government's activities in "protecting property rights."

22. WHAT IS THE CRITERION DETERMINING WHETHER REGULATION IS TO BE APPLIED?

The argument was indeed used formerly in favor of exemption from governmental regulation. The minority of the Supreme Court in *Munn v. Illinois*[1] and, later, in *Budd v. New York*,[2] thought that regulation was justified only in cases of "legal monopoly," never where the monopoly was merely "virtual." But the majority ruled the other way, and at present not even a monopoly at all, virtual or legal, is essential to make regulation constitutional. The emergency regulation of the rents for apartments has been sanctioned, though the landlords have not combined into a single concern.[3] What *is* the criterion by which a concern may be adjudged subject to legislative regulation of its prices, without violation of the Fourteenth Amendment? Up to the present time the United States Supreme Court has laid down no definite test. There has been no case in that court invalidating regulation on the ground that the business was outside the scope of constitutional control.[4] In justifying the regulation of

[1] 94 U. S. 113 (1876).

[2] 143 U. S. 517 (1892).

[3] Cf. *Block v. Hirsh*, 256 U. S. 135 (1921).

[4] In *Chas. Wolff Packing Co v. Court of Industrial Relations*, 43 Sup. Ct. 630, decided June 11, 1923, the Kansas Industrial Court Act was held un-

some sorts of business, the Court has at times expressed the opinion that certain other sorts were not subject to regulation. But these expressions of opinion have been mere *dicta,* and have not been definite or always consistent. The statements that the property must be "affected with a public use" or a "public interest" are mere bits of judicial rhetoric quite empty of definite meaning. It is submitted that no test will ever be found to be satisfactory, short of this: is the seller in a position to charge prices which yield more net earnings than there is any social reason for his receiving? And the application of such a test will require first a judgment of the economic justifications of every income received, whether from the sale of goods or the sale of services. If such is the test, the remedy cannot be confined to reduction of prices, since there are so many instances where the evil does not consist of charging too much to the customer, but of not paying part of it back to the general public. To charge a price to the customer which exceeds cost may well be regarded as more "reasonable" if the company is collecting it merely as an agent for the government, than it would be were the company (or its stockholders) to retain the excess above cost.

23. HAVE PROPERTY OWNERS "PRODUCED" THEIR PROPERTY INCOMES? THE WIDER IMPLICATIONS OF REGULATION

That the above test will be adopted by the Supreme Court before a generation or two of new lawyers have been given an economic training which deals with these questions, should that ever happen, may well be doubted. The probability is that the court will avoid enunciating a definite test as long as possible. And should the line "pricked out by concrete cases" show signs of becoming definite, the Court will probably prick out a new decision to blur the line—as it has blurred the line of the "police power" in the recent minimum wage decision.[1] The fact remains that in curbing the working power of regulated companies, the government is revising the power of ownership itself, not merely of formal grants of monopoly. The

constitutional in that it fixed wages which the packing company must pay and against which the workers might not strike. In the course of the opinion, Chief Justice Taft expressed strong doubt whether the preparation of food was a business "clothed with a public interest," the prices charged being fixed by competition. Whether the prices might be regulated, however, was admittedly not the question before the Court. "We are relieved from considering and deciding definitely," he said, "whether preparation of food should be" classed as a quasi public business, "because, even so, the valid regulation to which it might be subjected as such, could not include what this act attempts."

[1] *Adkins v. Children's Hospital,* 43 Sup. Ct. 394 (1923).

argument for letting the regulated company keep whatever earnings result from a rate fixed at a point above cost, is an argument which assumes that in some manner the company has "produced" these earnings, and that some "natural law" forbids the government to deprive people of what they have produced, except by such a scheme of taxation as will bear upon all according to their respective abilities. The fact is that in "protecting property," the law is intervening to restrict what would otherwise be the liberty of the non-owner; that it also restricts the owner's liberty in respect of other property owned by the non-owners of this property; but that the curtailment of the liberty of one man by the property rights of others is not by any means of the same extent or of the same practical significance as is the curtailment of the liberty of all the others by *this* man's property rights. In other words, some men have law-given rights over others which enable them to collect large incomes from the community, others have law-given rights which enable them to collect little or nothing at all. The income derived by the company which charges the price above cost or for that matter the income collected by any property owner, is not something created by that owner, but something squeezed out of others by a law-made pressure.[1] If there is no social ground for giving him more than corresponds with "cost," there seems no valid objection to the government taking the excess where a lower price would cause demand to exceed supply. And if the only reason for keeping the price above cost in a particular case is to prevent demand exceeding supply, it seems to be admitted already that in that case there is no social reason for giving the owner more than "cost." And this reasoning applies to all incomes; the very reasoning which justifies regulating the prices of public utilities cannot be stopped by any logical boundary until it justifies the correction of all incomes which exceed what, according to some still unformulated criterion, is "proper," the correction taking the form not merely of rate regulation, but of taxation as well.

24. WAGES AND SALARIES AS "OPPORTUNITY COSTS"

The incomes of property owners are the fruits of law-made pressure on the non-owners. Incomes for personal services are the fruits of

[1] I have pointed this out in greater detail in the following: "Rate Regulation and the Revision of the Property Concept," *Columbia Law Review*, xxii, 209 (March 1922); "Economic Considerations in the Restatement and Clarification of the Law," *Proceedings of the Academy of Political Science*, x., 50, July 1923; "Coercion and Distribution in a Supposedly Non-Coercive State," *Pol. Sci. Quart.*, xxxviii, 470, September 1923.

pressure exerted by the recipients, not with the aid of the law, but without its prohibition. The pressure consists of a threat to withhold one's services. True, the recipient almost always has to incur some sacrifice in order to obtain the income (unless work is altogether a pleasure to him), but the incomes for personal services do not by any means vary in proportion to sacrifice. They vary according to the good or bad fortune of the recipients in possessing capacities the market value of which is high or low. The enterpriser who hires them pays high or low wages, and the high or low wage figures as a "cost" to him. But the size of the wage depends, according to the more sophisticated of accepted theory, on the addition which the marginal laborer of any given group makes to the earning power of his employer. This will vary (other things being equal) with the number of workers in that group. Will the number adjust itself in such a way as to bring the wages of all into conformity with costs *to the workers?* In spite of Adam Smith's famous explanation of differences in wages, the answer is in the negative, for reasons pointed out most clearly, perhaps, by Taussig, elaborating upon Cairnes's theory of "non-competing groups." Within any one such group, any difference in the relation between wage and sacrifice may smooth itself out by drawing labor from the less to the more favorable occupation. But there are barriers between large groups which interfere with any such inter-group mobility. And no matter how high the wage and how little the sacrifice in the way of disagreeableness in any non-competing group, this will not suffice to draw labor from another group across the barrier. Nor will the supply of labor increase from within the group by a Malthusian response to the favorable condition therein. In all groups above the lowest, the wages may be said to be (from the laborer's point of view) an opportunity cost, not a sacrifice cost or an incentive cost. There is no "normal" to which they conform. In the very lowest paid group the case is perhaps different; it is possible that the supply in that group drifts into and out of the reservoir of the unemployed with every appreciable change in the demand for this labor, and thus keeps the wage in rough conformity with the cost of living.

25. ALL INCOMES THE RESULT OF COERCION, NOT PRODUCTIVITY

All incomes, in last analysis, whether derived from ownership of property or from personal services, are not "products" created by the recipients; they are payments derived from the rest of the community by the exertion of some sort of pressure. To say this is not to condemn the exertion of such pressure; it is the only means a man

has, under present arrangements, and perhaps under any workable scheme of things, for keeping alive. But to appreciate that each income is the fruit of coercion exercised either with the aid or without the hindrance of the government, is to deny that a coercive governmental alteration of the size and distribution of incomes is necessarily wrong. No particular income is sacred merely because it is the result of "free bargaining." The coercion in which it originated is not necessarily less "artificial" or "arbitrary" or even "confiscatory" than that which would take it away in whole or in part. The justification of each income must rest on some other ground than that the recipient has "produced" it.

26. THE ARGUMENT OF TAXATION AUTHORITIES AGAINST NEED OF DISCUSSING DISTRIBUTION

There are several methods by which the government can and does effect a change in the distribution that would come from property rights and "free bargaining" alone. Wage fixing in cases of compulsory arbitration we may leave on one side. The problem of defining a "fair wage" in such cases would doubtless take us into the depths of economic theory, but this paper is not meant to be exhaustive, and the writer of it has never pursued the "fair wage" theory into those depths. In rate regulation and taxation, however, the distribution is pretty obviously affected. Reduction of rates lessens the share going to the security holders of the company, and increases the real wealth enjoyed by the consumers (without increasing the market value of that wealth). Taxation lessens the real income either of the taxpayer or of the person to whose shoulders he may succeed in shifting the tax, and the expenditure of the resulting revenue adds to the real income of some classes, at least, of the community, and not in the same proportions as that in which the taxation diminished their real incomes. We have already seen how the authorities responsible for the development of principles to aid in the regulation of rates have managed to avoid passing judgment on the propriety of distribution, a judgment which they could not well pass without drawing on economic theory more than economic theory has as yet been able to yield up. The reasoning by which they have escaped passing such judgment was specious. In taxation, the leading authorities in this country have also professed aloofness from the problems of the propriety of distribution. If the distribution of wealth is faulty, they say in effect, correct it in some other manner; taxation is difficult enough as it is, without raising more difficulties as to distribution. Therefore, forget the faults of distribution when

levying taxes, but make each person pay, as nearly as is practical, according to his ability to pay. The result will be, it is true, to diminish the rich man's income by a greater amount than that taken from the poor man's; but since someone has to bear the burden, it is better that those best able to should bear the most.

27. SOME FAULTY ASSUMPTIONS IN THE "ABILITY TO PAY" THEORY OF TAXATION

This reasoning makes several assumptions which, it is submitted, are not sound. In the first place it assumes that whatever fault there is in distribution can be cured in some other way than by taxation. We have already examined circumstances where reduction by price regulation of the revenue taken by a producer is no real cure; and it is difficult to see any remedy more fitting than taxation. In the second place, it is assumed that everyone *can* be taxed in accordance with ability, whereas the truth is that since some taxes can be shifted and some cannot, a tax aimed at one man with great ability will burden, not him, but his customers; whereas if he is not burdened in some way, while another equally rich man whose taxes cannot be shifted, *is* taxed, what has become of the "ability" principle?[1] A third assumption that seems implicit in the reasoning of the "ability" school is the assumption already examined, that in determining what a man shall pay into the public treasury, the government must act as if the incomes taxed were not themselves the results of governmental action. An illustration will perhaps make this clearer. The collectors of internal revenue are of course under a legal obligation to account for all the revenue they collect and to turn it into the treasury, receiving for their own use amounts fixed by law as salaries. It would be absurd to ask why we should not find the gross revenue collected by each and make him pay to the government a percentage of that, on the theory of burdening the various collectors according to their respective abilities, allowing them to keep the rest. Yet if the property owners and other recipients of incomes are looked upon as receiving these incomes through the same sort of coercion as that exerted by the collectors of internal revenue, why should *they* be made to turn over to the government a percentage apportioned to their receipts, instead of *all* their

[1] Professor Seligman, it is true, has stated that the "ability" principle applies only to the levying of those taxes which cannot be shifted. This limitation, if adhered to, makes a larger breach in the "ability" principle than was perhaps realized. Cf. his *Progressive Taxation in Theory and Practice* (second ed.) 299–300, 1908.

receipts over and above what corresponds to the revenue collector's salary? Of course the "salary" due the income recipients is not so readily fixed as is that of an official revenue collector; and its function is not entirely the same—facts to be kept in mind in the application of any plan of re-distribution through taxation. The salary paid an official has, as a rule, one legitimate function—to enable the government to obtain the services of capable men. In judging the justifiability of any scheme of distribution we must keep in mind two things—a high income may be justified because it is essential to secure the services of the recipient, but it does not follow that no income should be paid to anyone in excess of what is needed for calling forth his best services. If society as a whole has more than sufficient real income to induce everyone to do his best, what is to become of the surplus? It has to be distributed in some manner, and the only object of taking "unearned" income from one man would seem to be, either to pay more to others who are not now securing enough for the best incentive, or else to turn it over to someone else by whom it will also be "unearned" in the sense of being unessential as part of the incentive.[1]

28. THE ADMITTED INAPPLICABILITY OF THE "ABILITY" PRINCIPLE IN CASES OF SPECIAL, MEASURABLE BENEFIT

All such questions would be raised in any thoroughgoing discussion of taxation and public expenditure, were it recognized that taxation is a legitimate instrument in wealth distribution. And the "ability" theorists might be less reluctant to admit its legitimacy if they but recognized the fact that the incomes themselves are products of governmental intervention or else of a private form of coercion. When they do recognize a special, measurable financial benefit conferred by the government on a limited class of persons, as where the government lays a sewer which raises adjacent land values, they have no hesitation in approving a system of levying the costs on the special beneficiaries, regardless of their ability to pay as compared with that of other members of the community. They do not call these payments "taxes," but "special assessments" or "fees." The justification of the levy would seem to be that such assessments do

1 The first object would be attained were we in a position to abolish such taxes as add to the prices at which things are sold by keeping down the supply. The producers now have incentive enough to produce *what they now produce*, but were the tax reduced they would have sufficient incentive to produce still more, which they could sell at the lower price. This process, by enriching consumers, might itself add to the total "unearned" income to be distributed.

not really burden those who pay them, since the payment is offset by the special benefit; in fact, the government would be rendering a special favor did it not levy an assessment equal to the "benefit"; and in these particular cases, there is no reason for conferring a special favor. The same reasoning would apply to justify charging the full special benefit even if it exceeded the cost incurred by the government.[1] To charge only the cost is to confer a special favor on the benefited class, of essentially the same sort as that already described, where a public utility company charges but cost and has to limit the service. Since incomes from property ownership are special benefits conferred by the government, it follows that failure to tax those incomes completely away is to confer special favors on that class. Here, however, unlike the cases just described, there is usually a good reason for conferring special favors on the owners (incentive, special needs, gratitude for special services, or what not), but frequently not for conferring as much as we do. The simple method in use in "special assessments" will not do, for we should not aim to neutralize the special favor altogether. How far to neutralize it is a question involving the whole subject of the ethics of distribution. Raising public revenue affects distribution; any scheme of raising it must be judged by its effects. A judgment of these effects cannot properly be waved aside by summoning the aid instead of the old "benefit" theory or the newer "ability to pay" theory of taxation.

29. THE NEED OF A THEORY FOR GUIDING THE CHANNELS OF INDUSTRY IN PRICE REGULATION

Rate regulation was forced upon us by recognition of the flaw in the classical assumption that perfect competition steps in when law-given monopoly steps out. Taxation we have had, even before Ricardo. In applying either instrument we are forced to seek for a theory of "fair distribution," for which accepted economic theory is

[1] Professor Seligman, in the chapter on the Classification of Revenues in his *Essays in Taxation*, contends that the special benefit cannot exceed the cost, but it seems to me that his argument is based on the reasoning applicable to the situation where the supply can be increased sufficiently to reduce the value. That situation is not present when the government lays a sewer. The supply of "benefits" is strictly limited. The supply is likewise limited when the government grants protection to property rights. In the case of land, for instance, it is only in a new and unsettled country that the supply is so great that the right granted to each individual to own a tract has a value equal to zero—the cost to the government of granting the right.

inadequate. Nor is a theory of "fair distribution" of income the only broken reed in the classical arsenal, revealed by the processes of price regulation and taxation. There is the other theory—that of the channels into which production should be made to flow. According to accepted theory, as already noted, there is an automatic process whereby industry directs itself to the production of things which will satisfy the most pressing wants of the community. We have already seen the flaw in the assumption underlying this theory—the assumption that one man's dollar expresses the same degree of want as does another man's. The flaw has indeed been pointed out frequently by modern economists. In pursuing the process of price fixing we find as well that, even were it agreed that the "natural" channels of industry are preferable to artificial ones, we are nevertheless forced to cut artificial channels in some cases where no natural ones exist. And we need some kind of theory to guide us in the cutting.

This necessity appears perhaps more prominently in the case of railroad rates than elsewhere. A cursory study of the more important decisions of the Interstate Commerce Commission, or of any good book on transportation, will reveal the fact that a large part of the work of that body is concerned with questions of comparative rates, rather than with the propriety of a company's entire schedule. To reduce one rate and increase another will usually produce a demand for more of the service for which the former rate is charged, less for the service which is sold for the latter. If the supply of each can be altered, the further result is to cause the railroad to produce more of the former service in response to the increased demands, and less of the latter. This in itself is a change in the channels into which the industry of transportation flows; and it frequently brings about changes in the channels into which other industry shall flow, too. A slight change in railroad rates may make or mar a given industry, may cause more of one product, less of another to be made, or more of a product to be made in one locality, less in another, with consequent changes in the flow of still other products to be consumed in the respective places. The regulation of railroad rates, then, is capable of producing marked effects on the channels of industry, and so also, though to a less degree, is the regulation of the prices of other goods and services. This all follows from the fact that determination of the net earnings to be allowed to a particular company does not in itself determine the rates that shall be charged if the company is producing more than one kind of service. The same total net earnings might result from any one of various rate schedules.

30. THE FALLACY OF BASING RATES OF JOINT SERVICES ON THEIR RESPECTIVE COSTS

But is there not some "natural" adjustment of the rates of the different services, which will result in the channels taking a "natural" course? Several such have been sought. Perhaps the crudest is one which several commissions have at times sought to apply and which has found favor with the Supreme Court; it is the principle of charging each class of traffic "its own" cost. Of course the difficulty, as has been pointed out again and again, is that a part only of the entire costs of conducting a railroad can be said to be caused separately by the rendering of each class of service. The rest of the gross earnings which the company must earn are to defray what are purely *joint* costs. These costs are occasioned by the traffic as a whole, but not in any specific proportions by any one class of traffic separately—that is, they would be no less than they are if any particular class of service had never been rendered. The commissions which have sought to base rates on the respective costs of each class of service, have segregated those expenses which are caused by each class, and then sought to apportion the rest according to some formula. In some elaborate attempts to apportion railroad expenses (notably in Wisconsin) we find some of the joint costs apportioned to ton-miles, train-miles and other formulas. The truth seems to be that any one method of apportionment is just as "natural" as any other. The attempts to apportion any but the separable costs are attempts which proceed on the false assumption that facts are being ascertained, whereas any apportionment of joint costs is not in truth an ascertainment of the cost occasioned by each class, but is a determination of how much each class *shall be made to* contribute to the support of the railroad which serves all the classes. How much each should be made to contribute obviously cannot be determined intelligently by a formula, but by a preference among the different possible channels into which industry can be made to flow.

31. CLASSICAL THEORY OF JOINT COST AND THE REGULATION OF RATES

But some economists seek a solution from accepted economic theory. Railroad services are one species of things produced at joint cost. In such cases, under competition, the price of each joint product is not supposed to conform to "its" cost; the prices of all the products produced jointly are supposed to equal the cost of the joint production, and how much of this cost will be paid by the sale of the one,

how much by the sale of the other, will depend on the relative demand for each. This was the doctrine as worked out by J. S. Mill, and the doctrine was applied to railroad rates over thirty years ago by Taussig in the *Quarterly Journal of Economics*.[1] But Taussig's article was an explanation of why railroad rates were no departure from accepted theory despite the diversities in rates which did not correspond with diversities of costs. It brought out the important distinction between separable and joint costs. But it did not point to any "natural" channels to guide us in regulating rates. It may be true that the unregulated prices of cotton and cottonseed, of wool and mutton, are natural adjustments. But in all cases the price of each product is kept as high as compatible with the sale of the entire supply of that product which results from the joint production, or which can be finished up, provided the price does not fall below the separable cost of finishing that individual product. The situation is different when we have a railroad furnishing joint services. The fact that we regulate indicates that if the price of each service were fixed on the same principle as that which guides the producers of wool and mutton, the railroad might get too much. If we are to prevent this, we must fix the prices of some of the joint services at points which will yield less (above separable cost) than the traffic is capable of yielding. We may assume for this discussion that the complication is absent which has been brought out in discussing another point where a reduction of price will call forth a demand greater than can be met. We may assume that we are dealing with a situation wherein a reduction of the price of one service will be followed by the rendering of enough of that service to satisfy the entire demand called forth by the reduction. We may also assume that a reduction in the rate for each service will reduce the total contribution made by that service to the joint costs (the excess of the total revenue from that service over the separable cost incurred in rendering it). Under such assumed conditions, if the total net earnings of the railroad are too much, the rates for *some* of these services may be reduced; if the total net earnings are too little, the rates for some may be increased; whereas if the total net earnings are exactly sufficient, it may still be well to reduce the rates on some of the services if the earnings are kept up by an increase of other rates. In all these cases it is obvious that the interests of the ultimate beneficiaries of each one of these services conflict with those of the ultimate beneficiaries of the others; and that the rate-making body

[1] v, 438, 1891, reprinted in part in Ripley's *Railway Problems*.

must determine ultimately which of the various services it is desirable to render most plentiful and cheap. For the cheapening of one means the enhancement of the price of others, with a consequent diminution in the amount of the latter demanded, hence produced. And the "natural" adjustment which governs the prices of joint products produced under perfect competition cannot guide us here, since that "natural" adjustment is simply one where each is sold for as much as the traffic will bear and yet where the sum of the prices so fixed equals cost. In the regulated industry, the sum of the prices may *exceed* the total cost unless the prices of some of the individual services are kept at less than the traffic can bear. In deciding how far below that level to keep the price of one service without precluding the possibility of keeping the prices of others also below that level, we find no guide in "natural law."

32. PUBLIC EXPENDITURE AND ARTIFICIAL CHANNELS OF INDUSTRY

When we come to public finance, the expenditure of public revenue is likewise a cutting of channels into which industry shall flow. Labor and capital, in response to government expenditure (as well as to other incentives), flow into the activities of war, judicial and administrative service, public education, road building and the like. How much shall flow into some of these channels, how much into others, can be determined by no "natural law." Here, as in rate making, the classical notion that it is possible, let alone desirable, for industrial efforts to be distributed wholly in accordance with natural law, is shown to be false.

33. CONCLUSIONS

Earlier economic theory reached the conclusion that under a policy called *laissez-faire* (which involved, however, wholesale governmental restraints on liberty, in the form of the "protection of property rights") the "natural," and the best possible, distribution of income and the "natural," and best possible, direction of the channels of industry would automatically take place; it was accordingly unnecessary for statesmen to have any definite notions of what the best distribution of incomes or the best direction of the channels should be in the concrete. Thoroughgoing *laissez-faire* has long since been repudiated by economists, but economic theory of the present day has developed out of the older *laissez-faire* theory. It has not set itself the task of throwing more light on these two major problems. Yet they are problems which have to be met in some fashion by governmental authorities in the course of monopoly control and public

finance. Writers on these subjects have managed to go about their tasks without facing these problems, and hence, though many of these writers are economists, they have not seen that in their own fields were problems calling for a revision of economic theory. That the reasoning which led them to overlook the problems of distribution and of the channels of industry in their own fields has been fallicious, is what I have attempted to show in this paper. Whether some new development of economic theory based on a more realistic examination of facts, will be able to throw light on these problems, I am not capable of asserting with confidence. Two things, however, I think are clear. First, the situation is far more complicated than has generally been assumed; hence all the light which economic research and analysis can throw on the problems is essential. Second, economic study alone can give no decisive final answer to the proper distribution of income and the proper channels of industry. It can clarify the situation, and trace further economic consequences of this or that adjustment. But once it has made the issues clear, the final judgment on the issues is an ethical one.

THE LIMITATIONS OF SCIENTIFIC METHOD IN ECONOMICS

by

FRANK HYNEMAN KNIGHT

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THE LIMITATIONS OF SCIENTIFIC METHOD IN ECONOMICS

1. THE MEANING OF SCIENCE

Since economics deals with human beings, the problem of its scientific treatment involves fundamental problems of the relations between man and his world. From a rational or scientific point of view, all practically real problems are problems in economics. The problem of life is to utilize resources "economically," to make them go as far as possible in the production of desired results. The general theory of economics is therefore simply the rationale of life.—In so far as it has any rationale! The first question in regard to scientific economics is this question of how far life is rational, how far its problems reduce to the form of using given means to achieve given ends. Now this, we shall contend, is not very far; the scientific view of life is a limited and partial view; life is at bottom an exploration in the field of values, an attempt to discover values, rather than on the basis of knowledge of them to produce and enjoy them to the greatest possible extent. We strive to "know ourselves," to find out our real wants, more than to get what we want. This fact sets a first and most sweeping limitation to the conception of economics as a science.

Even this statement of the scientific view of life as the conscious utilization of resources for given ends involves stretching the term scientific as compared with its most exact signification. It involves conceding the reality and potency of conscious thinking and planning, which in the narrowest meaning of science are illusory. From a *rigorously* scientific viewpoint, life is a mere matter of mechanics; what human beings think of as practical problems of conduct are subjective illusions; thinking and planning and all subjectivity are illusions; human actions are a detail in a cosmic panorama of the transformation of motion. But since it is impossible to discuss value in purely objective terms, we must simply assume the reality of the conscious data and leave it to philosophy to reconcile the contradiction, or to decide that it cannot be reconciled. We have to accept the common-sense notion of value or worth as our starting point.

Two sorts of experience are recognized as having worth, or as

capable of having it, an active and a passive; one is creation or control, and the other appreciation. These are not strictly separate experiences, but rather "aspects" of experience, yet they are practically separable to a large degree. The worth of active creation or control is a kind of appreciation; usually, the worth of the experience of activity depends more or less upon a feeling of worth toward or appreciation of some "result" brought about. But though the two things are usually more or less associated and overlapping, we are all familiar with extreme cases in which on the one hand the feeling of worth is nearly or quite purely passive and on the other the worth of an activity is nearly or quite independent of the character of the result. The literature of value, like that of science, shows a bias for monism, so there is a tendency to reduce all value to "contemplation" or to the "joy of being a cause," according to the temperamental predilections of the particular writer, but a candid observer must accept both, and all sorts of mixtures of the two.

Each of these fundamental categories also exhibits two sub-types. In the case of appreciation we distinguish an affective or emotional or esthetic, and a cognitive or intellectual pleasure. The mixtures and interrelations of these are again complex, but again we do separate, more or less, a worth which is pure appreciation from a worth which is a matter of "understanding." We do care to understand things which we feel to be repulsive, and we do care for things which we feel no impulse to try to understand. Sometimes the one sort of worth contributes to the other, and sometimes they appear to conflict. The esthetic experience of the cultivated person is in part a matter of understanding how a painting, say, or a piece of music or a poem produces its effect, but also the esthetic experience may be endangered by too much analysis. In general, it appears that beauty must involve a certain amount of illusion; the "machinery" must not be too manifest, or the interest in it too strong, or the effect is lost.

In the field of activity, also, there is a separation, less easy to make clearly, between that which is *spontaneous*, going to its end directly and immediately, and that which involves a conscious, calculated marshalling of means. The distinction holds for both the activity whose worth is inherent and that whose worth lies rather in the result which it produces. In creation and control as in appreciation, there is more or less conflict between understanding and enjoying. We strive to understand the how and why of our actions, to analyze the technique; and yet when this process is carried too far, and it becomes altogether a matter of routine manipulation of means to produce an effect preconceived and foreseen, there is a loss of

interest in the action. It might be interesting, if space allowed, to go into the problem of classifying our value experiences on the basis of the various combinations of these types, but our purpose is merely to sketch certain aspects of the meaning of science in connection with the field of values.

The immediate purpose of science is to enable us to *understand,* which again covers the understanding both of beauty and of the technique of action. But our modern, sophisticated way of thinking tends more and more to subordinate the desire for understanding as such to a desire for control. It can hardly be doubted that the spirit of science itself makes for this interpretation. A scientific age tends to relegate understanding for its own sake to the realm of sentiment and romance, an order of value regarded rather contemptuously in comparison with considerations of practice and power. The value of science is found in the *results* which it makes it possible to achieve, and science itself takes its place as a tool, tending toward the level of necessary evils. The love of science is brought by the scientific spirit into the position of a sentiment to be viewed apologetically. In the scientific, evolutionary, view of the world, too, the scientific interest is "explained" as a Spencerian transfer of attention from the real end to the means, which becomes erected into a pseudo-end.

Some rather obvious restrictions in outlook which arise from giving too predominant a place to science may be mentioned at this point. A scientific atmosphere obscures if it does not eclipse a considerable part of the field of values. It centers attention on the results of activity, weakening or destroying the value of the process. In addition, it emphasizes the quantitative aspect of the result which can be treated scientifically as against the qualitative or esthetic aspect which cannot. For these reasons activity comes to be concentrated along lines where results can be predicted and brought about "efficiently," that is, in the largest possible quantity with relation to a given stock of resources or productive power. This means concentration in lines of essentially repetitious work as contrasted with the spontaneous and creative. For science, manifestly, cannot direct creation in any true sense; it can only copy, or at best rearrange old elements in new combinations. True creation, which is the field of art, involves the invention of new ends as well as new means for reaching them. Science is always striving to "understand" art and produce its effects by the calculated application of rules; but to the extent that it succeeds in its endeavor the result is no longer art in the true sense. The evil is multiplied by the fact that because science can never explain why this is so, it tends to deny the fact. Real creation

involves a very different technique; or, it is better to say, it is not a matter of technique at all, but a kind of psychic sympathy or entering of the mind of the artist into his medium and a handling of it from the inside, whereas science works externally. Yet the contradiction already referred to is conspicuous here. The artist needs a great deal of scientific knowledge and technique; but when his work becomes reduced to these terms it ceases to be art and becomes merely copy-work.

We should note, however, that the satisfaction of the understanding or the successful production of a calculated effect *when it first happens* in any particular problem is very closely akin to the experience of creative activity. The expansive feeling of elation or mastery which comes with *discovery,* or sometimes even with learning from another person, is much like that of true invention.

The scientific interpretation of science is that "knowledge is power"; it is not a value in itself, but subordinate to activity, whose value, in turn, is in its results; it is "instrumental." We must accept this conclusion as true by definition; that is what is meant by scientific knowledge, which is our point here. Whether this pragmatic epistemology carries with it a pragmatic metaphysics, an interpretation of reality in terms of end and means, depends perhaps on whether one identifies scientific knowledge with knowledge in general. It is one of the philosophic assumptions of this essay that this *cannot* be done, that neither man nor his world can be understood in terms of categories derived from the exigencies of adapting means to given ends.

But to proceed with the definition of science: From the standpoint of knowledge, the problem of control is a problem of *prediction.* Conduct, which is the adaptation of means to ends, is necessarily forward-looking. To behave intelligently means to act in the light of valid knowledge as to what would happen in the given situation in the absence of interference from myself, and of the changes in this course of events which will result from any contemplated action of mine. In case I cannot bring about any change in the natural progress of events, or at least not any desirable change, I must still be able to foresee the progress itself, in order to react intelligently toward it. From the standpoint of a strict view of conscious behavior, we are not interested in the world as it is, except as a basis of predicting what it will be in the immediate or remote future to which conscious plans of action relate.

Science, then, is merely the *technique of prediction.* It is the mental mechanism or process by means of which we act intelligently.

From the scientific standpoint (or this quasi-scientific view which accepts motives as real causes) to "live" intelligently and to "act" intelligently are interchangeable expressions. And to act "intelligently" (shifting the emphasis) means to act in such a way as to bring about the result foreseen and intended; it goes without saying that any result brought about by deliberate action is a desired result. It is important to keep in mind that not all control is scientific in the sense of involving conscious, deliberate adaptation of means to the production of desired ends. Control begins in the control of our own bodies, since it is only upon them that mind or purpose can act directly. It is questionable how far this control of our muscular systems is ever "scientific" at any stage, and it is certain that it tends strongly to become unconscious and automatic, reverting to our second type of control experience noted above. Such fundamental activities as speech, for example, are probably learned in the first place by a process of trial-and-error or by accident, involving little conscious adaptation. A good part of it is no doubt "instinctive," such as the modulation of the voice to convey emotion. Any skilled technique when well learned, drops largely below the threshold. A trained pianist or typist thinks as little about the keys he strikes as does any normal person about the position of his vocal organs in articulation, and the skilled mechanic uses his tools in much the same automatic way; they have in effect become a part of his body. Perhaps the military strategist too may come to manipulate his army with little more thought than the skilled driver of a motor car gives to his pedals and controls.

It is clear, however, that for all this tendency of any instrumental adjustment to become unconscious, there is no such tendency in life as a whole. Instead of progressing toward the condition of unconscious automata, we are called upon constantly for more thinking; the mental strain involved in conscious as compared with unconscious activity increases continuously, and the mysterious liability to error which is characteristic of conscious responses in contrast with mechanical adjustments grows greater instead of decreasing.

2. THE TECHNIQUE OF PREDICTION, OR THE LOGIC OF SCIENCE

All science may be regarded as an elaboration and refinement of the principle that we judge the future by the past. A scientific treatment of the problem of prediction and control must assume that this is just as true whether the process is one of conscious or unconscious knowledge, deliberate or automatic response. Even if man, like the lower animals, inherits adaptive reaction patterns, the

basis of the adaptation is the same. A scientific world view has no possible place for the intuitive, or any other foresight of *new* truth, in advance of perception. Its fundamental assumption is that *truth is always the same* and is known through perception and memory. But that truth is always the same is equivalent to saying that the world is always the same. Change is unreal, or in so far as there is real change, the world is knowable only historically, the future is unpredictable.

The paradox, that if the world is always the same there is no problem of prediction, while if it is not always the same prediction is impossible, is resolved by means of two fundamental notions, law, and rearrangement, or analysis-synthesis. The essential idea in law is change of an unchanging character, that a thing does not change in "essence" if it changes predictably, since it remains true to its nature which is to change in the same unchanging way. Any predictable change, and any that science can discuss, is therefore analogous to movement along a path which can be represented by an equation, and of which any part can be calculated from the formula for any other part, however small.

The conceptual hiatus between a static and a changing world is further bridged in another way by the idea of rearrangement of the same elements in different combinations. Ultimately, both of these ideas merge in laws of rearrangement in the literal sense of spatial movement. Science refuses to credit the idea of internal, independent changes in simple elementary things, even in accordance with law, and insists on reducing all change to changes in the relations of unchanging elements or units. So the ordinary objects of experience are split up hypothetically into elements in terms of whose rearrangements are explained those changes in sensible things which are not brought into correspondence with external changes. A complete scientific explanation of the world would leave nothing but actual, literal motion. Of course the idea of such an explanation cannot be taken very seriously. The human mind balks at the outset at the notion of movement without something that moves, and the logical process of reducing change to motion attenuates the moving particles into a form imperceptible to sense and unreal to imagination. Moreover, practically speaking, mechanics itself has never been able to get along without the notion of force, which is quite clearly a mode of consciousness and not an existence perceived in the outside world. For practical purposes, again, we must stop far short of the ideal of rigorous scientific conceptions, and survey the process by which our minds organize that sort of provisional knowledge on which conduct

is based (outside of scientific laboratories, and in large part within them also).

To begin with, consciousness organizes the "big, buzzing, booming confusion" which is experience in its raw state, into a world of objects, existing and moving and changing in space and time. Our behavior is concerned with the properties of *things,* including their modes of behavior, which are truly properties as much as are the sense qualities. Properties and modes of behavior of things form the content of knowledge and the subject-matter of thought as the basis of action.[1] The axiom at the basis of practical thinking, the principle of identity or static principle already referred to, is simply that things remain "essentially" the same, that they have an inner nature which does not change. They may change as far as sensible properties are concerned, but only according to unchanging "law" and in definite relation to other things. We may state this axiom simply in the proposition that the same thing will behave in the same way under the same circumstances. The idea of a "thing," or identity itself, is just the recognition of permanence or sameness in the organization of qualities, as is clearly shown by what happens in reasoning.

If behavior meant only dealing with "the same things in the same circumstances," in a literal sense, there would be no occasion for thinking as we use the term. Intelligence would be a matter of *mere* memory. But the variety of things with which we have to deal is indefinitely too great for our minds to become acquainted with them; they do not remain the same in the perceptual sense, and the "circumstances" (which means their relations to other things) are similarly complicated and variable. These two facts, the mentally unmanageable complexity or manifoldness of the things which make up our world, and their habit of apparent change, necessitate the activity of thinking. In this sketch we shall not go into the logic of atomism by which sensible change is supposed to be reduced to rearrangement in space, and which belongs more to philosophy than to the logic of practice. Our study will concern itself only with the manner of formulation of those factual laws of change by means of which it is possible to predict the future and to behave intelligently.

The first step in the simplification of experience, and the simplest form of inference, is the act of classification in the sense of assim-

[1] The "new" logic of modern mathematics and neo-realist philosophy, dealing with empty relations and pure order, if it has any relation to conduct at all, has so little that it can be left out of account in such a survey as the present.

ilating identically similar things. The principle of prediction involved is that not merely the same thing but *like* things behave in the same way under the same conditions, or that what is true of one member of a class of similars is true of all. The principle is of very limited application, as there are few classes of objects alike in all respects. It holds nearly enough to be useful in the case of such natural classes as different leaves from the same plant or plants of the same variety, specimens of the same mineral, etc., and more accurately of such artificial things as machines of the same model, samples of the same purified chemical compound or other "standardized" objects.

In practice this principle merges into a second one which involves inference of a more developed type. Classes are formed of objects similar *in certain respects,* though they may be different in other respects. The principle of prediction here is that things alike in some particular will be or behave alike in some other respect. The formal logic of the syllogism (restricting it for the moment to universal propositions only) represents this process of reasoning by classification. The syllogism itself states the results rather than the process of inference, as is readily shown. If we consider the famous syllogism,

All men are mortal
Socrates is a man
Therefore Socrates is mortal,

it is evident that if Socrates is a man, we could not know that all men are mortal without already knowing that Socrates is so. Or, taking a different view, if mortality is an essential attribute of manhood we could not know that Socrates is a man without knowing first that he is mortal. Hence we could in no case know both premises without previously knowing the conclusion, and it cannot be said that we really infer the conclusion from the premises.

To bring out the real nature of the process of prediction of the future from the present or inference of what is not known by direct observation from what is so known, the propositions must be stated differently. What is known is that *other* men have been mortal, or, more accurately, that other "things" having certain observable attributes marking them as members of the class "Man" have turned out to have the attribute mortality, and that (minor premise) the object Socrates has these other attributes. It is inferred that he will be found to have the attribute mortality previously found associated with the class marks.

All inference is essentially of this character. An object perceived to have certain qualities is inferred to have others not open to observation but previously found associated with those which are observed. Most of our ordinary recognition of objects is really on this basis, we perceive relatively little, and infer most of what we think we perceive. Reasoning power is the capacity to single out *essential* characteristics, marks from which relatively much can be inferred, and associate with them the qualities really connected. The wide applicability of the principle, the possibility of inference and prediction, depends on the *fact* that the objects of experience do fall into significant classes having a great number of attributes in common. If the qualities of objects were assorted at random in the world we simply could not infer, and intelligence would be impossible. The dogma of the "uniformity of nature" therefore covers the stability or permanence of things *and the reality of classes.*

The theory of inference requires extension in several ways beyond the simple cases covered by syllogisms made up of universal propositions. The case where either premise is a particular proposition was treated by the old logicians, but not in a way to make it very fruitful for practical guidance. If we say that *some* men die of consumption and that X is a man, the conclusion that X *may* die of consumption is of little utility. Modern logic is able to go much farther, through the use of the theory of probability or statistics; but it seems best to note two other modern devices which do not sacrifice universality in the conclusion, before commenting upon this theory. The first relates to quantitative similarity as a basis of classification and inference. Many attributes (always including activities) are variable in degree rather than simply present or absent. In fact science is largely concerned with the question how much of one is associated with how much of another. It is fundamental to our knowledge of nature that the qualities found associated in a small number of cases make it possible to construct the whole functional relation between two magnitudes.

The second device carries the same idea still further. If we find a certain quantitative relation between A and B and between B and C, or between, say, A and different proportions of B and C, it is often possible to construct from measurements of a few cases a functional relation among the three variables by which innumerable cases can be interpreted.

In these statements we purposely avoid using the term "cause" or "force." It is far better to say simply factors or variables, for anything which the words cause and force add to the mere idea of uni-

formity of association is unreal and misleading. What is meant by saying that nothing happens without a cause is merely that every change is associated with other changes, and that all are mathematical functions of time. The terms antecedent and consequent are also to be used with caution. The inferred quality or response may be subsequent in time to that from which it is inferred, or it may not; it may be only a potentiality, like the fact that a blow or contact with a hot iron will injure flesh *if* it happens, the practical significance of which knowledge is to prevent its happening. A cause in the ordinary sense need not be antecedent to its effect, as for instance when we cause an increase in the tension of a spring by stretching it. Probably the commonest meaning of cause is that it is the phenomenon which we can control directly, and by controlling which we are able indirectly to control another phenomenon upon which we cannot act directly. The idea of cause may have other meanings, but it would complicate this discussion unduly to go into more detail. The notion of force has long been recognized as a reading of our muscular sensation of effort into physical changes. We know only the effects, never the force (except in the case of our own muscles); force is, as Poincaré has said, a convenient conceptual device for simplifying certain equations.

The subject of the composition and resolution of variables, or synthesis and analysis, calls for one further observation. Sometimes the qualities of the compound can be predicted from those of the elements by addition, and sometimes by more complicated methods, and sometimes not at all. We can add forces in mechanics, and predict the resultant *a priori;* we can form chemical compounds, but cannot predict the result, or discover any general relation between the properties of the compound and those of its elements (except the mass) but we can be sure that the same elements combined in the same way will always give the same compound. This fact is useful because and only because the elements are definite substances identifiable by other and simpler means than testing for the particular phenomenon we wish to predict—the formation of the compound. There is much loose talk about the "analysis" of mental phenomena, which as we shall see later on is largely a pernicious use of words; in general these cannot be taken apart or combined experimentally, and neither "elements" nor "compounds" have any general marks of identification.

We return now to the question of the particular proposition and the theory of statistics. Though it may not be possible to draw any conclusion by which conduct may be guided from the premise that

some men die of consumption, a premise stating that of any large number chosen without bias, a constant proportion will meet this fate may be very useful. For oftentimes our plans relate or can be made to relate to a large group of cases instead of a single case. Thus in business, if it is possible to tell how many buildings will burn, the individual owner of any one building may protect himself by clubbing together with other owners in an insurance organization of some sort. If a dealer knows what proportion of his accounts will prove uncollectible he can make allowance for this item as a cost of doing business and be as safe as if he could control the contingent event itself. Even where cases cannot be classified objectively, it is sometimes possible to estimate probabilities, and the mere fact of taking chances one after another, even where there is no similarity in the ventures, produces if it is done "intelligently" a tendency to cancel out gains and losses.

A final consideration practically quite as important as any of the foregoing is that very little indeed of any person's actual knowledge of the world is derived in any way from his own observation and reflection, that an overwhelmingly preponderant portion comes through other persons by a process of *communication.* Thus the basic fact which makes possible any effective mastery of the world by anyone is the fact that the world of objects is the same for all minds. Knowledge is not practically usable unless it is "dependable," and the chief canon of dependability is that it can be demonstrated to and verified by and through other persons. Science is nearly restricted to the field within which such demonstration and verification are practicable, that is, to data which are in fact the same for all normal observers, *and which can in fact be communicated* so accurately as to compel all to recognize the identity. It is hardly thinkable that without effective intercommunication we could ever form the idea of a real world or that conscious, intelligent thought would be possible.

The combination of all these methods of prediction gives rise to an elaborate and complicated technique, which is all useful and indispensable in scientific research. Yet as a matter of fact, none of it is ordinarily employed with any definiteness or accuracy in reaching the practical decisions of everyday life, even those relating to the material world. (In the prediction of human behavior and social changes, this is much more strikingly the case, as will be seen in our next section.) For a simple illustration, consider the forecasting of the weather. The scientific meteorologist indeed follows something of the formal methodology outlined above, measuring variables, determining functional relations, calculating probabilities, *et cetera.*

But the farmer or old salt who uses no such process of analysis and measurement may often predict the weather with as much reliability. His processes are largely unconscious, whether truly intuitive or only unconsciously rational. (The scientific dogmatist will insist that there can be no real intuition, but we are not so sure, especially in the field of human interpretation and communication.) In any case, the practical decisions of everyday life, even those regarding material nature, are only to a small extent scientific, whatever one may care to assume as to the ultimate theoretical possibility of a scientific determination of the issues. People make little pretense of enumerating exhaustively the variables upon which a conclusive demonstration would depend, and less pretense of measuring them, and have only the vaguest idea of the functional relation between observed factors and those to be inferred. What actually takes place in any practical situation such as predicting the course of prices, locating oil wells or forecasting crop yields, and still more so in the more fundamental things such as deciding whether to go to college, selecting an occupation for life and the like, is that the person makes an *estimate,* by a process only in a small degree conscious, and not describable in any considerable detail. Most decisions are enormously complicated by the fact that we do not know what we want, or why, as has been emphasized by the psycho-analysts.

We are now ready for the next step in the argument—the specific problem of applying scientific methods to the prediction of human phenomena. These two introductory sections have aimed to clarify the meaning of science as a technique of prediction, and the conditions requisite to scientific prediction in any field of data. These conditions may be regarded as a part of the definition of science. Knowledge usable for prediction in the guidance of conduct must consist of propositions which state unchanging truth and hence can be made only with regard to data which are ultimately static. Merely historic facts are of no direct practical use, and it would conduce to clear thinking to separate sharply scientific from historical truth in the terminology. In general, a scientific proposition must hold good for a class of objects or situations; it states a dependable association or a numerical probability of an association between an attribute not open to direct observation and one which is so, and usually expresses a quantitative relation between the two. In general, truth cannot be considered scientific unless it is demonstrable, which means that it must be alike for all observers and accurately communicable. The scientific view of experience postulates a world which is independent of observation, and hence is of course really the same for all observers. But it is to

be noted that there can be no scientific evidence for this view beyond the actual tendency of observers to agree. There is in fact the widest divergence in the amount of agreement among different observations according to the character of the data. There is never any close agreement quantitatively, but science has in many fields evolved a technique of *measurement* which compels agreement. In the field of human attributes and behavior, all these prerequisites, the stability of the data, their assimilability into classes, even their objectivity and especially the possibility of their objective measurement—will be found subject to sweeping limitations which set corresponding limits to the scientific treatment of the phenomena.

3. THE SCIENTIFIC TREATMENT OF HUMAN DATA

A very large portion of the conduct of any human being is related in some way to other human beings, and if it is to be intelligent, it must be based upon correct prediction of their behavior; and, needless to say, we desire and need the power of controlling the behavior of persons quite as commonly as in the case of other phases of the "environment." It goes without saying that we do predict more or less correctly in this field, and act more or less intelligently in relation to other persons. We know what to expect of them under various circumstances, we count upon them in innumerable ways without being disappointed in the outcome in anything approaching the proportion of cases called for by the law of probability if our predictions were unfounded. And we do influence the conduct of others by deliberate action. But does this unquestioned fact of prediction and control by common-sense methods prove the possibility of scientific treatment? The question is whether it is possible to *improve upon the performance of common sense,* as science has done in the realm of physics and biology, by the conscious formulation and use of rules based upon a wider comparison and more careful analysis of cases.

At the outset we are confronted with a problem as to what *is* the method of common sense in predicting human behavior, and what the correct relation to it of the method of science. It is fairly clear that common sense does not reach its conclusions in this field by comparing and analyzing cases as objective phenomena, treating human beings as "things," and observing their uniformities. It *connects actions with feelings* and pictures behavior in the closest association with, if not by means of, an idea of the *conscious attitude* of the other person. The behavior attributes of human beings constitute character or personality, which is thought of in a quite different way

from such physical qualities as the fluidity of water or the explosiveness of dynamite. Should science proceed in the same way, and associate feelings with situations and actions with feelings, or should it establish its relations between situations and actions directly?

The latter seems the simpler course, and the youngest of the sciences, calling itself Behaviorism, has arisen to advocate this method of procedure. The behaviorist points out that primitive man attributes consciousness to inanimate objects just as we attribute it to ourselves and our fellow beings, and contends that we should grow out of the childish practice in the one case as we have in the other. There is no way of demonstrating whether any reaction is conscious or not, or what sort of consciousness if any accompanies it, not to mention the problem of finding where in the evolutionary scale consciousness appears. It is a plausible inference that the proper procedure is to ignore consciousness and infer the responses of human beings to situations from previous observation and analysis of their responses to situations. The behaviorist (in the exuberance of his enthusiasm) is likely to go farther and deny outright that consciousness actually has anything to do with behavior or that there is any such thing. But in this he is turning philosopher and carrying the discussion outside the field of science. The practical question is whether the notion of consciousness is *useful* in prediction. It might indeed be just as useful if consciousness did not "really exist" as if it did, and it is the usefulness, not the existence, which practically concerns us. Scientific discussion does not always keep science separate from metaphysics as it should do.

It is impossible to argue at length in this paper the issues involved in behaviorism; we can only state briefly our own position, which is that consciousness *is* useful, and its recognition necessary and inevitable, in the interpretation of human behavior. The reason is simply that we cannot help ourselves. (And it may be admissable to step over into the domain of the metaphysical problem long enough to note that the same reasoning justifies accepting the ontological reality of consciousness, that it is the only sort of reason we ever have for believing in the existence of anything.) As a matter of fact we never succeed entirely in eliminating consciousness from our ideas of material things. We have noted that mechanics has not been able to do without the notion of force, though whatever force is, more than motion, is a fact of consciousness. It is impossible to construct in thought a world of real objects in purely objective terms; if objects are to have the qualities of consistent behavior they are inevitably thought of as possessing the rudiments of mind. We interpret the be-

havior of the most material thing by to some degree putting ourselves in its place. Still more true is this when we come to consider the behavior of living things. Purely mechanical biology remains an aspiration of the scientific intellect. Some sort of teleology is inevitable in speaking of the phenomena of life. The *will* to live and to increase is more than the *fact* of living and increasing, and we cannot account satisfactorily to ourselves for the facts of the lowest animal and plant life without recognizing an element of striving as well as processes and results.

In the field of human behavior we have indefinitely stronger reasons for accepting consciousness as real and potent, in the fact of *communication.* The conclusive reason for believing that an action is conscious is that the subject can *tell us so,* and tell us about the motives. Logically, the behaviorist is right; we do not perceive consciousness, in any other person at least; we cannot prove or verify it; we only infer it from behavior. But in spite of logic we all recognize that as a matter of fact we know consciousness more surely and positively than we know the behavior from which theoretically we infer it. We cannot scientifically explain, except most superficially, how we communicate feelings or read expression in the looks and acts and words of others. Yet if anything in human life is clear it is that our whole intellectual life is built upon the fact of communication. Without it we could never develop the idea of objectivity, the foundation of scientific reasoning, and as noted in the preceding section, the test of reality is the possibility of verification, which depends on communication with the consciousness of others.

If the objective cannot exist without intercommunication, it is a truism that the subjective cannot be discussed without it. There is a mystery about our being able to talk and understand each other in regard to purely subjective experiences, but there is no question of the fact. It would appear, especially in view of the fact that we have no knowledge of purely objective reality, that we must concede some sort of consciousness to anything that can be made a subject of intelligent discourse. In connection with the problem of conduct it is surely clear that if consciousness is denied and a behavioristic position assumed, an end is put at once to the possibility of discussing values or motives. We might discuss activity—though it is not easy to see how the discussion could have any "meaning"—and even the "cause" of activity (in the phenomenalistic use of that word), but there would be no such thing as a "reason" for activity; the idea of reasons would become meaningless and the subject matter of all discussion of values unreal.

How do these considerations affect the possibility of scientific prediction of conduct? Within limits, it is possible to discover laws of behavior, as such, in the objective sense. The term "man" denotes a very real and distinct class of "object"; seldom is there disagreement as to whether any particular speciman belongs to the class. And yet, outside of physiological processes and reflexes (and even these are not at all uniform) it is astonishingly hard to find traits or characteristic definite reactions which one can confidently infer from membership in the class, which are common to substantially all members of it. Even laughing, crying, and talking are not definite reactions to definite stimuli. In this field the "laws" which we may hope to reach are at best statistical in character, and even these are subject to narrow limitations, for reasons which will be pointed out presently.

The behavior of human beings depends upon their *previous history,* and the history of no two individuals is the same or closely similar, *in essential respects.* The difficulty is that the reactions, assuming them to be determinate, are affected *in a large degree* by *imperceptible* differences in the situation. This is illustrated by the stories of "clever" animals. Dogs and horses have frequently seemed to their trainers to be reacting to spoken commands, but careful experiment has shown that this was not true at all, that they were really dependent upon some "cue" involuntarily and unconsciously given by the trainer himself and so subtle in character that careful study has sometimes failed to disclose just what it was. The wide divergence in the results obtained by different persons attempting to influence people *by the same technique* is a familiar fact, as also that the effects of laws and administrative measures seldom correspond to the expectations of their framers. Even in the case of the elemental and "gross" motives this is true. Who can say whether a specified punishment will reduce a particular crime? whether dropping bombs on an enemy population will weaken or strengthen their military morale? whether raising wages will cause men to work harder or to loaf, or what the effect of a change in the price of diamonds will be upon the sales? It depends!

These considerations form a convenient transition from the behavioristic method to the "psychological," which attempts to give a scientific treatment of consciousness. "It depends," in such cases, upon how people feel and think others feel, on their own mood and temper and the attitude which they see back of the "stimulus." Suppose, then, we accept conscious states and attitudes as data for the prediction of behavior: how is the prospect for scientific treat-

ment, superior to the judgment of common sense, affected? We doubt whether it is much improved, if at all; we question the possibility of any prediction which leaves consciousness out of account and builds upon stable relations between stimulus and reaction, but we also doubt whether the formal methods of science can be carried far in the field of conscious data. The argument of the behaviorist seems much more conclusive in its negative aspect than it is as a basis for construction. There is no doubt whatever that a competent judge of human nature could study the situation in any such case as those named above and render an opinion which would be valuable as to the probable outcome. But can he, or anyone else, state the data on which his conclusions would rest, and the character of the "functional relation" between the knowns and unknowns? The question appears to be self-answering.

We have no objective identification marks for moods and tempers, as shown by the fact that description of them runs practically in terms of the conduct to be anticipated. We say a person or a crowd is in the mood for certain acts, or in a frame of mind where such and such things are likely to happen. We make the prediction of behavior directly, unconscious of the objective character of the "data," and use it to characterize the latter. Such expressions as an "ugly" or a "jovial" mood have really no deeper or different meaning, they suggest conduct rather than identifiable marks from which conduct is to be predicted. We predict by simply "knowing," without any conscious process of inference, what to expect.

This does not mean that the art of prediction and control of the behavior of people cannot within limits be taught and learned. But it is taught and learned by a very different method than that of giving and following rules. Painting and story-writing can be taught and learned, but not in the main by *telling how* to paint and write, and it is to the study of the fine arts that one must turn for an understanding of the methods of communication generally, in the field where facts of consciousness are involved. Intuitive and intellectual or unconscious and conscious processes are involved and interrelated in ways which go beyond the scope of this paper or the writer's competence to begin to discuss. It appears that formal statements do not carry us far beyond such truisms as that men in a mood for some activity are "likely" to do it under "appropriate" conditions.

The whole question is one of empirical fact: are there objectively recognizable features in the situation which are uniformly associated with the different possible eventualities? The insertion of feelings as factors between the stimulus and the reaction only makes it more

clear that the sequence simply is not uniform as far as our senses can discriminate; we can count upon people neither to feel in a certain describable way under conditions identical within the limits of perception and verification, nor to act in the same way under the promptings of the "same" feelings; we cannot count upon the same person to repeat himself, much less other persons to copy him. Perhaps *if* the person and the stimulus were really the *same,* the same conduct would follow; but it is the most characteristic attribute of persons to change in unpredictable ways, and the "stimulus" being in practice usually some "reaction" of another person or persons, is equally fluctuating and uncertain. It is futile, practically speaking, to argue the question whether the same stimulus "really" produces in the same or a similar subject the same reaction; the fact confronts us that whether we speak in behavioristic or psychological terms, the same stimulus, *within the power of perception or any available test to determine,* acting on the same subject, similarly defined in terms of the available means of knowing identity and similarity, *does not* produce the same conduct, within the practical requirements of classification.

It would be hard to over-emphasize the importance of the fact that the practical usefulness of scientific principles depends upon our ability to infer with certainty (or a known degree of probability) and in general quantitatively, a large number of *facts which cannot be observed directly* from *facts which can be easily recognized and measured,* or from historical data easy to obtain. It would be useless to know the solubility of sodium chloride if we had no way easier than measuring its solubility of telling when we had sodium chloride to deal with. In dealing with human behavior, there is a lack of recognizable marks for the sort of non-observable characters we are interested in inferring, if indeed there is any fundamental human nature which determines behavior. There is an abundance of identification data, easily ascertained, but no discoverable connection between these and what we wish to know. It is easy to find out many things about a human being's ancestry, race, education, and the like, and some traits and capacities can be identified and measured with a degree of accuracy, but nothing seems to follow with any certainty from such facts. We could not tell from a man's antecedents or life history or from his stature or his "I. Q." such simple things as whether he would take sugar in his coffee, or would drink coffee at all, whether he would have the qualities of leadership or could be trusted with money. Literature and conversation are replete with generalizations about the behavior of "women," "Jews," "The

English,'' even about citizens of one county or town in contrast with another, about ''Yale men,'' ''Methodists,'' men of a certain family name, and so on *ad lib.;* but everyone who has given any study to the question knows that when such statements are definite enough to test they are trivial or false. There are indeed many negative generalizations which are dependable, as that a man cannot be a competent physician without a scientific education, or that cripples do not make good messenger boys, but the contrary positive assertion is rarely valid.

To repeat, it is possible for a good judge of human nature to form opinions with a high degree of validity as to what individuals or groups are likely to do under conditions present to observation. Moreover, it is possible to convey information and describe situations intelligibly to a considerable extent, and to make general statements regarding the art of judging human nature which have some degree of helpfulness. But none of this is done by the methods of science. It is all in the field of art, and not of science, of suggestion and interpretation, and not accurate, definite, objective statement, a sphere in which common sense works and logic falls down, and where, in consequence, the way to improve our technique is not to attempt to analyze things into their elements, reduce them to measure and determine functional relations, but to educate and train our intuitive powers.

All the foregoing argument is further strengthened and emphasized by the development of the psycho-analytic method in psychology, involving the introduction of subconscious mind. We cannot elaborate here the significance of this movement but it is evident that while its postulates may be useful as the basis of a technique of control in certain special cases, they introduce enormous new difficulties and uncertainties in the way of reducing behavior at large to general laws. In so far as the new theories are sound they show that men's real motives are often quite other than they think them to be, and extremely difficult to come at. The human propensity for ''rationalizing'' of which some of Dewey's followers have made so much, and the distinction between ''good reasons'' and ''real reasons'' so genially portrayed by James Harvey Robinson are kindred developments which emphasize the difficulty of predicting human behavior from motives. As to psycho-analysis, it seems clear that the last part of this term is used in a sense so different from its ordinary scientific meaning as to be descriptively misleading. The procedure would be much more accurately called psycho-interpretation.

Besides behaviorism and psychology, there is a more or less definite

and distinct line of attack on the problem of scientific prediction in human affairs, which goes under the general designation of sociology, in which we include the philosophy of history and social psychology. Under this head we must first allot a few words to the theory of human instincts. The controversy on this subject is a rather disheartening piece of logomachy, and for our purpose the matter may be very briefly disposed of. No one has ever denied that there is an innate element in human behavior; what people do and like to do is not altogether a matter of training and historic accident. On the other hand, it appears that no one has contended that (beyond a few simple reflex movements) human beings inherit any preformed action patterns by virtue of which, independably of teaching, they will do any definite thing under any definite circumstances. Many activities, such as eating, sexual mating, talking, fighting, fleeing from danger and the like are very readily and naturally learned. Yet it is most essential to observe that these are not specific activities, that the concrete content of all of them, what is eaten and how, the forms of courtship and family life, the language spoken and so on—are after all acquired, and within astonishingly wide limits one type of content is acquired as readily as another. In Professor McDougall's original version of the instinct theory it did not in fact profess to be a theory of conduct at all, as he expressly insisted that both the stimulus and the reaction in the case of any particular instinct are indefinitely modifiable, that only the central part, the feeling, is a stable datum. Moreover, the instincts are valueless for prediction for another obvious reason. They include all possible types of reaction to fundamental situations, and do not pretend to tell us anything as to which type of reaction will follow in any given case. An animal in danger may fight, or run away, or perhaps feign death; whatever he does, the theory gives us an "instinct" to do just that. It is not practically helpful to be told that some one of the possibilities of a situation will eventuate, though it may have a power, somewhat difficult to account for, of satisfying—after the event—a certain type of craving for a reason why.

For the content of reactions, the prediction of actual behavior, we are thrown back upon what is more properly perhaps the province of sociology, the study of social inheritance, of *mores* or institutions. The history of the attempt to define culture and found a science of culture by discovering laws of its development and change is one of the most fascinating of all subjects of inquiry. We cannot in the present connection even refer to the individual proposals that have

been made, or summarize the arguments that have been advanced pro and con in regard to the possibility of a science, or a philosophy, of history. It is enough for our purpose to point out that among those who ought to be most competent to judge, the historians themselves, few indeed believe at the present day in the fruitfulness of such endeavor, or express serious respect for the attempts of sociologists and philosophers to formulate laws of culture evolution. The function of the historian is to find out and show "wie es eigentlich gewesen," or as Professor A. C. McLaughlin has expressed it, to learn what happen*ed* and to steer clear of generalizations as to what happ*ens*. The same historian is frankly skeptical about the project of making history "useful." On this point, the profoundest of the philosophers of history himself remarked, with a touch of bitterness perhaps, that the only thing to be learned from history is that men will not learn from history. Sir Leslie Stephen puts the case still more strongly in his familiar warning that when an author asserts that "history proves," a point, the reader should simply read instead, "I propose to assume without evidence."

The present writer would hasten to say that he does not understand these authors to mean that the study of history is really not useful, and that he himself considers history the one subject about which no one can ever know as much as he needs to know. But the usefulness of history is not in giving us rules which can be made the basis of inference and prediction; it is not in this respect a science, but rather an art. The study of history works in a quite different way, through training the judgment, giving insight into human life. The useful knowledge of history is chiefly unconscious knowledge and its application will also be unconscious. As we have remarked of the interpretation and prediction of human situations in general, the basis of the inference is not consciously known. Often, indeed, the premises can be discovered and put into words *afterward,* but that again is more history, but not science.

The primal question in regard to a science of history is simply the question in regard to any science, which we have repeatedly stated: is the material dealt with stable (in its elements at least) classifiable and verifiable? that is, *are* there (in it) "laws" to be discovered? The truth about history and culture could hardly be better stated than it has been (paradoxical to observe) by the father of the new Historismus in American economics, Dr. Thorstein Veblen: . . . "there are no cultural laws of the kind aimed at [by the early German Historical School] beyond the unprecise generalities that are

sufficiently familiar beforehand to all passably intelligent adults."[1] Yet Dr. Veblen goes on to build up a science of history of his own (in the field of economics at least), based upon *causal laws* most sharply distinguished from "uniformities of sequence in phenomena," upon causes which "*determine* the course of events," which "*make* the uniformity or variation." This, according to him, is "modern science," and compared with it the "natural laws" . . . "of the nature of empiricism" are "quite fatuous." It would be a waste of white paper for the present writer to give any extended criticism of this position. If I know anything at all about modern science, its first principle is the complete repudiation of all causes that "determine" or "make"; the first article in its creed is the declaration that human knowledge is limited to empirical generalization concerning the uniformities of phenomena. Moreover, the only alternative to this empirical view is a belief in entelechies of some sort, and of all such notions Dr. Veblen is as scornful as he is of the "aphoristic wisdom" of empiricism.

Of course science does make a working distinction between causal laws and empirical laws, but it is all a matter of degree of generality. That "quinine is good for ague" is an empirical law in comparison with the statement that quinine is a specific poison for the animal parasite which "causes" the malaria by interfering in definite ways with the normal physiology of the blood. But one is entitled to ask "why" poisons are poison and why the destruction of red corpuscles by the *plasmodium malariae* produces the familiar symptoms, and these questions could only be answered by descriptive propositions of a still more general character. Except for a higher degree of generality we could never reach a "cause" in any other sense than that in which the presence of swamps "caused" malaria in the days before the parasites and their mosquito carriers were known.

There is another theory of human nature put forth under the caption of sociology by Dr. Wm. I. Thomas and the "Chicago School." It is a theory of interaction between human nature and socially inherited institutional "values." It proposes to explain human con-

[1] *The Place of Science in Modern Civilization*, 262. This statement is again much more extreme than I should make myself. It is a question of *how far* beyond common sense a scientific study of history can go. I should contend, not only for the power of history to educate common sense, as already indicated, which is a very different thing from yielding scientific laws, but also that there is possibility of systematizing common-sense judgments and improving their accuracy, within limits. The study of history can undoubtedly find some "laws" if the term is not taken too rigidly.

duct in terms of these values and the "attitudes" of the reacting individuals. It is an interesting theory and offers in the writer's opinion much greater possibilities for throwing light on behavior than does the science of behaviorism. It may be of great practical value as an aid in educating common sense, and should be infinitely more efficacious than the childish doctrine of instincts in making events seem more intelligible afterwards. But when it comes to the prospect of finding "laws" which can be used practically for *predicting* conduct—that is a different question, and one in regard to which we must entertain grave doubts until its possibility is demonstrated. For this ambition to be realized the same list of assumptions given for other sciences must hold good; these attitudes and values must be stable, reducible to a manageable number of classes and, most improbable of all, the sociologist must be able to discover objective marks of identification by which they can be recognized before they express themselves in conduct. We suspect that it may prove possible by this means to "explain" conduct in the *post facto* sense to a large extent; that is, it may be possible to show that much of it is really according to law, to show *afterwards* that what resulted in any case was what should have been expected from the "forces" at work. But if these "forces" cannot be identified and measured, simply, in some other way than by waiting for the effect which it is desired to predict, it is obvious that there is no hope of prediction.

One after another, all avenues of escape are apparently closed, and we are forced back upon the conclusion already several times stated, that human phenomena are not amenable to treatment in accordance with the strict canons of science. They will not yield generalizations which can be used as the basis of prediction and the guidance of policy, because there are no generalizations about them which are true; that is, no generalizations about our observations of them. Whether, say, to an infinite intelligence, they would be analyzable into uniformities, whether any characterization could be permanently true, or whether truth itself changes, is another question, belonging to metaphysics. But as far as our observations go, they simply are not uniform; human beings do not maintain their identity as to behavior traits and do not fall into a manageable number of behavior classes with objective and measurable identification marks; and this is practically true whether we do or do not attempt to use conscious states or attitudes as data in the classification. Each part of this proposition may be given a few final words of elaboration.

The fundamental fact in the way of a science of human nature is

a familiar characteristic shared by all the higher animals, that the reaction of an individual to an "object" depends not only or mainly on the individual and the object, but on the *previous history* of the individual. Of course one can object that what the individual *is* at the moment determines the reaction, that his past history operates only by changing him. This cannot be proved or disproved as a theory, but is practically untrue, as there is no possible way of observing the changes, if any, made in the individual by his experience. The phenomenon is variously designated as associative memory, or mnemism [1]; or on the lowest plane, the conditioned response; or on the highest plane by saying that the individual reacts not to the object as such but to what it *means* to him. Or in Bergson's more picturesque phrase, the animal carries its past with it into the future in a cumulative process of growth. Long before he is adult, a being with man's sensitiveness to passing experience and his capacity for conscious and unconscious memory has become such a unique aggregation of attitudes toward meanings that there is no use in talking about accurate classification; he has to be treated as an individual. In addition he is highly unstable, and most especially is largely unknowable, since as already observed, the associations which condition his responses are quite inaccessible to observation. No life history could conceivably be detailed and accurate enough to make them available as scientific data. And, to repeat, the "stimulus," in most of the conduct which we need practically to predict, consists of "reactions" of other persons, and is therefore equally unclassifiable and in large part unknowable.

We may grant that in their responses to certain "elemental" stimuli and urges people are appreciably similar. They all experience the motives of hunger and sex, fear and anger and so on. And even though the concrete mode of expression of these motives is almost entirely derived from training and social suggestion, cultural background is also relatively stable in reference to these elemental things. Given familiarity with one's nationality, social class, education, etc., it may in fact be possible to predict a good deal about the probable course of his life. If he grows up in the United States he will no doubt eat the flesh of swine, cattle, sheep and abstain from that of cats, dogs, horses; he will be monogamous (in theory), will give some sort of acceptance to some conception of Christianity (at least as opposed to other religions); if in the Southern part of the country,

[1] See Bertrand Russell, *The Analysis of Mind*, Chapter IV, and the work of Semon there referred to. The Freudian psychology has served greatly to emphasize the rôle of the past in the present behavior of human beings.

he will think himself imbued with an antipathy to negroes as a race (though this is largely a misapprehension) and so on.

There is no doubt, moreover, that scientific study can give a much more accurate idea than that of common sense as to the actual probability of many contingencies and vicissitudes of life. There is some possibility, in these elemental reactions, of finding "laws" which have some value—laws of a "statistical" character. We can learn something about the effects of various causes on birth-rates, marriage, divorce, etc. In the sphere of economic activity especially, no one will gainsay the value of statistics and the statistical study of cause and effect. At best, however, the difficulties of defining units and getting reliable information at the sources, and all the obstacles familiar to workers with official statistics, set serious limitations on the method. It so often costs more to get the facts than is involved in the policy in question, or the process takes so long that the question has to be settled or settles itself before the results of investigation can be made available. A current news item remarks upon a discrepancy of something like forty per cent. in the figures put out by two governmental departments on the amount of cotton in the United States, *last* December, not in the future.

In addition to all the staggering practical difficulties of statistical study of social phenomena, the method is subject to two sorts of general limitation. In the first place, it is restricted, as noted, to the "elemental" factors in life. But the progress of mankind is away from the elemental, away from the natural, in regard to which we may be supposed more or less stable and similar, to the artificial, where we are capricious and divergent. Let any one candidly estimate the fraction of his own activity or of his expenditure of income which is devoted to elemental needs, to the maintenance of health and efficiency. Even though his budget be relatively very modest, the fraction will be quite small. A German scholar lecturing in this country recently remarked that it is astonishing how easy it is to live on an income worth about a hundred American dollars a year, when everyone else is doing likewise.

The other limitation is that it is only with reference to individuals in distinctly individual relations that differences cancel out or reduce to percentages. Wherever they in any sense constitute a real group, wherever the reactions have any way of influencing each other, a very different situation is met with. Even suicide has been known to become epidemic. When there is any effective means of intercommunication among the individuals subjected to the action of a cause, they cease to act as individuals and the effect becomes a matter

not of statistics but of group psychology. We say that a group is "organic," meaning simply that the action of individuals in groups is not necessarily related in any simple or discoverable way to their actions as individuals. Prediction of the behavior of groups offers all the insuperable difficulties of prediction of individual behavior; they simply are not stable, or reducible to manageable classes or to be characterized in any objective terms other than those which describe their conduct itself. Groups, and societies, like individuals, carry their past with them into the future and grow in historical uniqueness. They also react to meanings rather than situations, and are quite as sensitive and erratic as the individual.

We seem to be forced to the conclusion, not that prediction and control are impossible in the field of human phenomena, but that the formal methods of science are of very limited application. Common sense does predict and control, and can be trained to predict and control better; but that does not prove that science can predict and control better than common sense. And it seems very doubtful whether in the majority of social problems the application of logical methods and canons will give as good results as the informal, intuitive process of judgment which, when refined and developed, becomes art. Art is not science, and only within narrow limits can it be reduced to science (in which case of course it ceases to be art). It seems to us that science is a special technique developed for and applicable to the control of physical nature, but that the ideal so constantly preached and reiterated, of carrying its procedure over into the field of the social phenomena rests on a serious misapprehension.

Nor is it, we may suggest, a misapprehension only as to the character of the material to be worked with. It would carry us outside the field of this paper and into a discussion of a very different character to argue the moral question involved in the very notion of social control. In practice this can only mean either something on the order of self-control, which is obviously a very different thing from the manipulation of cause and effect, or else the control of one part of society by another part. No doubt each individual and class in society is anxious enough to get hold of a technique of controlling the rest of society; but is that an aim about which the social philosopher should concern himself so seriously? Within limits it is; for in any organized system a part of the individuals must be in control of the rest. In this sense social control is an adjunct to law. But law itself, most of us admit, should be minimized; the ideal is *freedom,* not control. Also, in any actual society there are children

and innumerable adults of all degrees of incompetence to control themselves intelligently, in regard to whom an effective technique of control is a real desideratum. But approaching the problem from this concrete standpoint manifestly puts it in a very different light than simply transferring the ideal and methods of the scientific control of nature over to the field of controlling men.

But the only point we have wished to develop in this paper relates to the pure theory of methodology. In this field we have striven to implant doubts as to the extent to which, in view of the actual character of human data, we may improve upon the results of common sense by the use of the formal methods by which such progress has admittedly been made in the way of mastering physical nature. We may help to clinch the point by suggesting that the mental process of predicting and controlling human behavior may be analogous to the process of recall in memory. The power of recall is an unquestionable fact, and it is probably true that it can be developed by training, to some extent. But no scientific analysis has told us *how* to recall, described a technique or formulated rules for recalling more effectively. We set the mind to work at the task of digging up a missing name or fact; we know that mental process accompanied by effort is going on, though the attention may be elsewhere and the mind, consciously, otherwise occupied. We cannot tell what the process is in any terms which will facilitate it; we only know that after a certain period of effort and the confused feeling that the mind is at work on the problem, the datum sought for comes into consciousness—or that it does not, as the case may be.

It may well be the same with the problem of predicting and controlling the behavior of our fellows. The process seems to resist analysis or formal description. It is a problem of interpretation, of formulating a result and inventing a technique for bringing it about, not of verified observation, of methodical inference and control by the application of formulas. One must simply *learn* to interpret and to lead his fellows. It is like esthetic interpretation and creation; one lives with the problems, discusses, attempts to formulate judgments intelligible to others and to embody his ideas in creative work, and to understand the judgments of others and appreciate their work. And finally he finds himself understanding and being understood, and his results turning out more or less in harmony with his intentions.

The kind of thing which human nature is is shown by the forms of language used in describing it. Discussion of human nature, like discussion of art works, runs to a relatively slight extent in terms of objective, sensible qualities, but predominantly in language which

suggests rather than asserts; its meanings are conveyed by figurative rather than literal forms of expression. It is difficult to appreciate the relative importance of figurative language as compared with literal. By far the greater part of written and spoken discourse is more or less figurative, and it not only conveys a meaning, but usually a meaning which it would be impossible to express directly, scientifically. People are far more concerned with meanings than with sense qualities, and meaning, being a subjective phenomenon, must be suggested rather than stated. The behaviorist-materialist may insist that expressions like "a stalwart soul," and "my love's like a red, red rose" are "really" based on physical similarity of some attenuated sort. But he cannot point out in terms of sense qualities wherein the resemblance consists, and his assertion is therefore mere dogma, as far from the "facts" of experience as the ravings of any mystic. One is just as free to believe that there is more to it than physical resemblance in any sense, that there is a realm of meanings no less real than the verifiable world of physics. It is doubtful whether any language, except possibly the arbitrary symbols of mathematics and symbolic logic, is entirely literal, just as it seems that reality cannot be thought of in purely objective terms. The meanings which are conveyed, but not expressed, by figurative language, cannot be taken apart and put together, and it is a misuse of the term "analysis" to apply it to our thought concerning them, just as all the rest of the technique of natural science is misapplied in their sphere.

4. ECONOMICS AS A SCIENCE

In spite of all the foregoing, there is a science of economics, a true, and even exact, science, which reaches laws as universal as those of mathematics and mechanics. The greatest need for the development of economics as a growing body of thought and practice is an adequate appreciation of the meaning, and the limitations, of this body of accurate premises and rigorously established conclusions. It comes about in the same general way as all science, except perhaps in a higher degree, i. e. through abstraction. There are no laws regarding the *content* of economic behavior, but there are laws universally valid as to its *form*. There is an abstract rationale of all conduct which is rational at all, and a rationale of all social relations arising through the organization of rational activity. We cannot tell what particular goods any person will desire, but we can be sure that within limits he will prefer more of any good to less, and that there will be limits beyond which the opposite will be true. We do not

know what specific things will be wealth at any given place and time, but we know quite well what must be the attitude of any sane individual toward wealth wherever a social situation exists which gives the concept meaning. In the same way we know that in any productive operations on this earth there are some general relations between quantity of resources used and quantity of product turned out.

These principles are only less abstract than those of mathematics. It is never true in reality that two and two make four; for we cannot add unlike things and there are no two real things in the universe which are exactly alike. It is only to completely abstract units, entirely without content, that the most familiar laws of number and quantity apply. Yet no one questions the practical utility of such laws. They are infinitely more useful than they could be if they ever did fit exactly any single concrete base, since all that they lose in literal accuracy they gain in generality of application. By not being strictly true in any case they are significantly true in all.

It is not necessary to regard the general, *a priori* laws of mathematics or economics or such mechanical principles as inertia as being "intuitively" known in any inscrutable way. They may all be more advantageously treated as mere facts of observation, characteristics of the world we live in, but characteristics so obvious that it is impossible to escape recognizing them and so fundamental that to think them away would necessitate creating in the imagination a different type of universe. The "necessary" character of axioms is undoubtedly due, not to their being created or given to experience by mind, but rather on the contrary to the fact that the mind has not the creative power to imagine a world fundamentally different from that in which we actually live.

This conception readily fits the character of the general laws of economic theory, such as diminishing utility and diminishing returns. The former is a general statement of the *fact* that men with a given quantity of exchange power do not (unless they are feeble minded) expend it all upon the first commodity they run across, or the one which happens to be uppermost in mind at the moment, but distribute it in some more or less determinate way over the available goods. There *is* a valid distinction between the intelligent and stupid or insane expenditure of money.

In the same way there is, and every normal adult *knows* that there is, a general law of the relation between quantity of resources expended and quantity of goods produced. It is a fact of the world we live in that "goods" are usually produced, not by single agencies

working alone but by a combination of resources, in much the same way that "satisfaction" is produced by consuming a variety of goods; and the character of the dependence is much the same in the two cases. In a universe governed by a general law of increasing returns the output of goods would be increased by decreasing the amount of resources devoted to their production. Such a universe would be bedlam.

It is a common objection to deductive economic theory that from obvious principles only obvious conclusions can be established and nothing really significant can come out of it. This assertion is belied by the facts of economic science itself, not to mention mathematics, where a structure of boundless and ever-growing scope and intricacy is built up on the basis of a few simple axioms. Yet it all "works"; its conclusions are descriptive of reality and are indispensable in predicting and controlling the phenomena of the physical world. In economics also, the significance of the conclusions of general theory is patent. They are not "obvious," since the ablest students are not in agreement in regard to many of them, nor useless for practical purposes, since the broad outlines of social policy depend upon them and are quite commonly misguided through the failure of legislators and administrators to understand and follow them.

Nor are the general laws of economics "institutional." They work in an institutional setting, and upon institutional material; institutions supply much of their content and furnish the machinery by which they work themselves out, more or less quickly and completely, in different actual situations. Institutions may determine the alternatives of choice and fix the limits of freedom of choice, but the general laws of choice among competing motives or goods are not institutional—unless rational thinking and an objective world are institutions, an interpretation which would make the term meaningless. Economic activity consists in the use of certain resources by certain processes, to produce "wealth." The content of the concept wealth is largely institutional, and the resources available and processes known and used at any place and time for producing wealth are in a sense historical products; but there are general laws of production and consumption which hold good whatever specific things are thought of as wealth and whatever productive factors and processes in use.

For illustration we may consider the assertion commonly made even by economists who do not recognize the function of general laws, that the way to understand price fixation is to study the machinery and process of marketing. The mode of organization of the market

may indeed have a good deal to do with price, and that in at least two ways. It brings the buyers and sellers of the goods more or less perfectly into communication with each other, furnishing the channels through which the real price-fixing forces, the facts of demand and supply, work out more or less freely and effectively to a determinate result. In addition, what we call marketing machinery and organization includes a large element of direction of energy into manipulation of demand, creating real or fictitious qualities in the goods marketed, through true or false information, or through mere psychological compulsion in the form of suggestion and exhortation. In so far as these things are present and operative, they are, of course present and operative; but they do not affect the fact that in the large the conditions of supply and demand determine the prices of goods. Other considerations produce aberrations from the result of perfect intercommunication among buyers and sellers who know the goods and their wants, but they are to be understood only as producing *aberrations from* the fundamental tendency and hence in subordination to it. They are of the nature of friction, divergence of materials from conditions taken as standard, and the like, in the workings of the laws of mechanics in actual machines.

There is a close analogy between theoretical economics and theoretical physics. Both treat of the relations between cause and effect, between force and change, without reference to the question of what forces may actually be at work in any particular case or what effects it may be desirable to produce. In both fields, the *application* of the principles does depend precisely upon these questions of the particular ends in view and means at hand, and upon all the conditions present. But the application of principles is impossible without principles to apply. It is no argument against the practical value of pure theory that taken alone it does not yield definite rules for guidance. It is a recognized fact that laboratory physics could not have made anything approximating its actual progress in modern times without the aid of a relatively separate development of mathematical theory by men who have not been experimenters.

The laws of economics are never themselves institutional, though they may relate to institutional situations. Some, as we have observed, are as universal as rational behavior, the presence of alternatives of choice between quantitatively variable ends, or between different means of arriving at ends. Others are as universal as "organized activity," independent of the form or method of organization. A large part of the extant body of economic theory would be as valid in a socialistic society as it is in one organized through ex-

change between individuals. Other laws relate to behavior in exchange relations, and of course have no practical significance where such relations are not established. Still others cover behavior in situations created by even more special institutional arrangements, as for example the differences in business conduct created by the custom of selling goods subject to cash discount or by the existence of a branch banking system as contrasted with independent banks. An intelligent conception of the meaning of science requires a clear grasp of the meaning of classification and subclassification, of laws of all degrees of generality. Each law is universal in the field to which it applies, though it may not give a complete description of the cases which it fits. Quite commonly a law has the form "*insofar as* the situation is of such a character, such things will happen." Any law is significant if it gives a sufficient part of the explanation of a sufficiently common type of occurrence.

Scientific laws fall into a sort of hierarchical order from still another point of view than that of the classes of phenomena to which they apply. A law states that under given conditions given changes will occur. But the "given conditions" may be only relatively given, and may themselves be changing in relation to other causes which condition them, and so on. After explaining an event in terms of causes immediately at work, it may be necessary to explain those causes, bringing in other causes to be explained in turn. To a large extent these stages in the process of explanation fall in different sciences, one taking as data the results of another; but sometimes several stages may fall within the province of one science. The latter is true in economics, and the problem of what are to be treated as data becomes especially troublesome. We shall return to this point shortly.

If the term economics were to be interpreted in the literal sense, as covering all behavior which involves the adaptation of means to ends and the "economizing" of means in order to maximize ends, then economics would be an almost all-inclusive science. It would take in about all of what we call rational behavior, since thinking is just the technique for guiding the performance of this function. But the study of this vast field falls into certain natural divisions, and after all the generations of discussion there is still need for clear delimitation of these and recognition of the methods appropriate to each. The process of want-satisfaction, or rational behavior, involves certain elementary factors: (1) the wants to be satisfied, (2) the goods, uses or services of goods, and human services, which satisfy them, (3) intermediate goods in a complicated

sequence back to (4) ultimate resources, on which the production of goods depends, (5) a series of technological processes of conversion, and (6) a human organization for carrying out these processes. This human organization again is two fold, including (6-a) the internal organization of productive units or enterprises, which belongs rather to the field of technology than to that of the other phase which is (6-b) the social organization of production and distribution in the large. Theoretical economics as the term is generally used is concerned almost exclusively with the very last factor, the general social organization, in which the nation and to a large extent the world is the unit.

As a basis of division of labor in the investigation and study of a field which is still vastly too broad for a single science, it is tacitly agreed to separate further certain *methods* of organization as fields for different groups of workers. The most important division is that between *political organization*, on the one hand, covering the various methods such as monarchy, democracy, etc., based on territorial sovereignty, and on the other hand what has come to be called *the* economic organization, worked out through exchange in markets and prices of goods and services. Thus economic theory has in practice come to be restricted to the analysis of social interaction and coordination through the price mechanism, that is, of organization through the competitive sale for money by individuals (really by families) of productive services (of person and "property") to business enterprises, and the competitive purchase from business enterprises with the money obtained of goods for consumption. It is the business enterprise, variously constituted, which carries on the actual production. Thus of the three main elements in economic life, wants, resources and organization, economic theory deals directly with one aspect of the organization, and only incidentally with the other elements. Wants are in the province of psychology, sociology and ethics; resources fall to various other sciences, and the technological aspect of organization to a vast number, and the internal organization of business to a special branch of economics.

The great fact which makes economic theory so vague and so difficult is the confusion already referred to as to the relations between cause and effect or the interpretation of "given" conditions, or in scientific terms, the separation of the constants and independent variables, from the dependent variables. This problem underlies the crude distinction often drawn between "static" and "dynamic" economics, and between short-time and long-time views of the price problem. It is also central to the issue between the conceptions of eco-

nomics as deductive theory and as "institutional" economics. All these contrasted notions are purely relative, matters of degree; at one extreme we might have a discussion limited to the abstract theory of markets, at which point indeed some of the mathematical treatments virtually stop; at the other extreme we should have the philosophy of history (in the economic field, however defined) and that is what institutional economics practically comes to. It should go without saying that all are useful and necessary.

To begin with, needless confusion has been caused by the unfortunate use of the terms "static" and "dynamic." These are highly objectionable because they have in mechanics a definite meaning unrelated to the main issue in economics. The problem of conditions of equilibrium among given forces—"statics" in the proper sense—is often important in economics, but is after all subsidiary, as indeed it is in physical mechanics. The larger question is that of whether the forces acting under given conditions tend to produce an equilibrium, and if so how, and if not what is their tendency; that is, it is a problem in dynamics. This type of problem has been too largely passed over hitherto, leaving a fatal gap in the science. The crying need of economic theory today is for a study of the "laws of motion," the *kinetics* of economic changes. Physics could hardly have made a start until two sorts of resistance to change were sharply distinguished, that is, inertia and friction. The centering of economic theory about the possibility and condition of equilibrium has caused the study of the laws governing economic changes in time to be neglected. The least serious attempt to formulate and use the concepts of mass, momentum, energy, etc., or their analogues, in relation to economic change, and to measure economic force and acceleration, would have shed a flood of light on the contrast between mechanics and economics and the methodologies of study in the two fields.

We can hardly over-emphasize the contrast between economic dynamics in this proper sense,—the study of the laws of change under given conditions,—and the major problem above indicated, as to what conditions are to be treated as given. At the very outset we are confronted with a question in regard to which confusion reigns supreme, the question whether and in what sense human wants are to be considered in economics as data (or independent variables). We are not called upon to argue this question here, but merely to point out that it is by no means simply answered. Wants are usually treated as *the* fundamental data, the ultimate driving force in economic activity, and in a short-run view of problems

this is scientifically legitimate.[1] But in the long-run it is just as clear that wants are dependent variables, that they are largely caused and formed by economic activity. The case is somewhat like that of a river and its channel; for the time being the channel locates the river, but in the long run it is the other way.

Similar statements hold for the other half-dozen elements in the economic problem. The means of want-satisfaction and the resources used to produce them, and the technology and business organization according to which the process is carried out—all are *data*, causes, independent variables, in some regards and with reference to some time periods, and all are effects, dependent variables, in other regards and with reference to other time periods. The only ultimately independent variables are those features of nature and human nature which are in fact outside the power of economic forces to change, and it would be hard to say what these are. Even the laws of technology and physiology operate in economic relations as people believe them to be rather than as they are, and our beliefs concerning them are by no means fixed or independent of economic events.

Such a mass of interrelated data seems to call for a combination of three methods of treatment which must logically be sharply differentiated. The first is economic theory in the recognized sense, a study, largely deductive in character, of the more general aspects of economic cause and effect, those tendencies of a price system which are independent of the specific wants, technology and resources. The second division, or applied economics, should attempt a statistical and inductive study of the actual data at the particular place and time, and of the manner in which general laws are modified by special and accidental circumstances of all sorts. That is, on the one hand it should get the facts as to the wants, resources and technology in the situation to which the study is intended to apply, and the precise form of such functional relations as the general theory cannot describe more accurately than to say for example that they are "decreasing"; and in the second place it should ascertain and take account of facts and principles too special in character for the general theory,

[1] The argument of earlier sections of the essay should have made it clear that only within restricted limits are wants to be regarded as data for science in any case. Civilized people act perhaps as much by way of experimentation in wants and satisfactions as they do in response to wants for definite things. But explorative behavior cannot be rationally directed in the sense in which action directed toward a foreseen result is rational, and it is apparently without the pale of strictly scientific treatment.

or which are not matters of general agreement. The argument of the third section of this paper should prove that this branch of the science is subject to very narrow limitations; the data lack the stability, classifiability and measurability requisite to scientific treatment, and actual economic practice must as we have argued be at least as much an art based on wide general knowledge and sound judgment as a science with accurate premises and rigorous conclusions.

The third division of economics is the philosophy of history in the economic field, or what some of its votaries have chosen to call "historical" and others "institutional" economics, studying "the cumulative changes of institutions." In so far as it aspires to practical utility it will endeavor to predict long-period changes in the factors which applied economics accepts as data and attempts to observe and use as bases of inference. As far as can be seen now, this third division, even more than the second, is a field for the exercise of informed judgment rather than for reasoning according to the canons of science. The movements of history are to be "sensed" rather than plotted and projected into the future.

Within the compass of the first division of economics, that of economic theory, there is a practically limitless number of problems and points of view which may afford bases for separating independent variables from dependent. But we can distinguish some four or five levels in the stability of data, corresponding to stages in the causal sequence, causes at one stage becoming effects of more general and stable causes at the next. First. The price situation *at a moment* is the resultant (as far as it can be explained in terms of general forces) of a tendency to equilibrium between offers to buy and offers to sell, all of which are based upon speculative opinions. Neither the actual supplies of goods nor the ultimate demand operate *directly;* they act only indirectly in so far as the facts control the opinions of the traders, which opinions fix the prices. In highly organized markets, there is a fairly effective focussing of the real speculative opinions of the persons who have any active interest in the market. In the great bulk of consumption goods there is no well organized market, and the price at any time and place is subject to influence within rather wide limits on each side of the true competitive level by a wide variety of accidental and special factors, especially by "monopoly" in divers forms and degrees.

Second. For most commodities there is a more or less definite production period, or interval within which the supply available in the world market at least, will not be much affected by price changes. As regards agricultural crops the period is sharply fixed.

As regards manufactured goods it is less definite, but there is usually relative stability of supply for some period, though it may be much more quickly responsive to price changes in one direction than the other. In any case the phenomenon of a period within which supply is fairly unchangeable is general enough to justify recognition of a theory of price with reference to it. For this problem, the physical quantity of supply available, or for which commitments have been made, is the supply datum, and the demand curves of the ultimate consumers are the constants on that side of the price adjustment.

Third. For longer periods, of say a decade, the situation is more complex. The supply of any particular good is obviously a dependent variable, responsive to price forces rather than causal of them, through the shifting of productive power from one industry to another. But for such periods the total productive power of society may be treated as roughly constant (or subject to considerable change only from causes outside the regular workings of the price system). Also the population and its consumptive habits, the distribution of wealth, knowledge of technical methods and the like may be viewed as *reasonably* independent variables. These, then, are the "causes" which control and in terms of which we explain the "dependent variables" with reference to this period, the prices of goods and of productive services and the apportionment of productive power among different industries and of product among different persons. Within such a period the extent to which productive power can actually be moved about, and at what cost, depend upon causes special to each individual situation and about which no generalization can be made.

The largest reservation called for in assuming the fixity of the data controlling production and consumption over a period of years relates to the permanence of wants. As the standard of living rises, the economic interests of people are transferred more and more out of the sphere of fundamental needs into that of esthetic and social gratification and pure experimentation. Thus wants become more unstable and as a result the interest of producers is centered more in the field of arousing wants or changing them to fit particular products and less in the field of studying wants and producing goods to fit them. Yet although the bulk of the national expenditure now has little relation to strict physiological needs if social and esthetic standards were to be disregarded, it is still true that most of it fits into a fairly stable set of cultural values. Only over longer periods, of generations, do the fundamental social standards and ideals change greatly. The study of such long-time changes would seem to be the

most conspicuous task of institutional economics, though similar reasoning applies in a not much smaller degree to changes in the other fundamental factors of the economic situation. No one would belittle the importance of studying these historic movements in the general structure of social standards and relations which presents the fourth level or stage in economic causality. But neither, we think, can anyone contend that such a study should displace the other branches of economics which either are fairly independent of institutions or take them as they are at a given time and place and use them in explaining the immediate facts of economic life.

The prospect of actually predicting the historical changes of institutions does not, as we have repeatedly observed, look very promising to us. The possibilities seem to be restricted to two main lines of approach. Institutions might be treated as entities on their own account and internal, inherent laws of growth and change found in them, which could be projected into the future. This sort of independent change, of an animistic character, is not in favor with the modern scientific mind, for the reason presumably that experience generally shows changes to be "explicable" in terms of relations to larger more fundamental changes, in a sequence leading back to geologic and astronomical causes. This is the other alternative, to explain human culture and its movements in terms of general laws of nature and of biology, as already suggested. The work of Buckle represents perhaps the most thoroughgoing attempt yet made in this direction, and his leadership has not produced much of a school of followers. The theories of natural selection and the materialistic interpretation of history have had hard sledding and have not got far, even in explaining the past, nor anywhere in sight of the goal of power to predict. The fact seems to be that man is at heart a sentimentalist, as far, in general, as he can be and live, or a little farther. Only the animals are really "sensible," knowing what is good for them and doing it. The formula which will predict changes in the motives and conduct of men, either by discovering an internal law or by relating them in some determinate way to the predictable facts of nature, is not, we believe, likely to be discovered soon. The statements that "history repeats itself" and its equivalent, that "human nature is always the same" are true, in a sense. But it is a sense that cannot be defined, and such a sense that definite inferences drawn from the principle are more likely to be false than true. Trained judgment and human insight seem to be more effective in predicting the future than any discoverable law, and that is not going very far.

So our argument is chiefly a recital of the limitations set by the nature of the data upon the scientific treatment of human problems in general and those of an economic character in particular. In the realm of physical nature, the exact methods of science have carried understanding and control enormously farther than common sense could go. But this was because the data are relatively stable, reducible to classes of manageable number, and especially classes with recognizable and measurable indices. None of these essential features seem to hold good of human data. Moreover, in any deep view of the case, the problem of understanding and controlling human behavior is radically different in character from that of explaining the material world and using it. Physical objects are not at the same time trying to understand and use the investigator! The practical problem of getting along with our fellow human beings must be attacked in the main by a method very different from the technique of natural science, a different kind of development and refinement of common sense, which carries us rather into the fields of esthetics. In a limited field in economic data, due largely to the fact that exchange has reduced the factors to definite measurable quantities, we can have an exact science of the general form of relations. It can tell us little in the concrete, and its chief function is negative—to offset as far as possible the stupid theorizing of the man in the street. The real sociology and economics must be branches of literature as much as of science. In fact they need to be both, and commonly succeed in being neither. It is no wonder that these sciences are still in the stage of violent disagreement among their followers as to what they are and what they are about. The first step toward getting out of this slough, we suggest, is to recognize that man's relations with his fellow man are on a totally different footing from his relations with the objects of physical nature and to give up, except within recognized and rather narrow limits, the naïve project of carrying over a technique which has been successful in the one set of problems and using it to solve another set of a categorically different kind.

SOME RECENT DEVELOPMENTS OF ECONOMIC THEORY

by

RAYMOND T. BYE

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SOME RECENT DEVELOPMENTS OF ECONOMIC THEORY

1. THE POINT OF VIEW

Toward any project of change there are possible three points of view. There is that of the conservative, popularly dubbed the "stand-patter," who, apparently viewing the world and its institutions as having attained their ultimate form, clings tenaciously to the past, resisting all progress. There is also that of the evolutionist. He knows that the world moves onward, but he regards this process as one of orderly growth. Therefore to him progress means no rough breakage with the past, but a gradual modification and development of what has gone before. There is also that of the revolutionist. He sees only the defects of the past and present, and, too eager for future possibilities which he conjures up in his imagination, he would throw away all of the old to substitute in its place something entirely new and untried.

Economic theorists to-day find themselves divided into three similar groups. The body of doctrines now set forth in our text-books and taught in our classrooms is a development of the teachings of two or three generations ago, still bearing many of the earmarks of its origin. Many of the exponents of this neo-classical economics, brought up under the old school, have become enamored of its dialectics and logical symmetry, and continue to dispense it to their disciples in much of its original form. At the opposite extreme is a group of severe critics. Impatient at the abstractions and strained logic of neo-classicism, enthused with new discoveries in psychology, and with the development of induction in the study of social phenomena, they would throw away much or all of the classical teachings, hoping to substitute for it a new economics, resting on sounder premises and using a better methodology. They are the revolutionists of economic theory.

Between these two groups the wise scholar will choose a middle ground. Evolution, rather than inertia or revolution, is the rule in scientific thought as well as in other realms. The body of economic thought that is the developed product of such men as Adam Smith,

John Stuart Mill, Alfred Marshall and their fellows cannot be wholly false. They were good observers and keen thinkers; it is unlikely that their conclusions could have been entirely mistaken. Nor have their critics succeeded in giving us anything better to take the place of their work. The great majority of the criticism is purely destructive. Yet it would be an error to conclude that there is no ground for criticism. It would be folly to believe that economic theory has reached its final form. The teachings of to-day are not those of Adam Smith; nor will those of to-morrow be those of to-day. Economics is in process of evolution. As our knowledge of allied sciences grows, as the tools of observation and measurement available to the economist become more perfected, our generalizations are becoming more accurate and useful, and will continue to do so. Older theories are being modified and corrected; but progress is being made, and will continue to be made, by building from what has gone before. It is the purpose of this essay to survey some of the modifications of older theory that recently have been incorporated into the science, and to point out some of the possibilities for future growth. Incidentally it will be appropriate to undertake an appraisal of some of the criticisms urged against current theory.

2. THE SUBJECT-MATTER OF ECONOMIC THEORY

It has frequently been asserted that economic theory is tending to become more and more centered in the theory of value and distribution, to the exclusion of other subjects. To Adam Smith political economy was a broad study of all forces contributing to national wealth; but Ricardo focussed attention upon the problem of value and distribution, and the interest aroused by the marginal utility theorists accentuated this centralization of subject-matter. Critics now attack this, holding that it narrows unduly the scope of economic study and leads to a discussion of unimportant subtleties to the exclusion of more important practical problems. It is true that the average treatise to-day gives a great deal of space to these subjects. Value theory is made the central theme. The discussion of production is largely an analysis of the four factors land, labor, capital and business enterprise, handled in such a way as to bring out the principles of diminishing and increasing returns, population, etc., which will later be used as explanations of costs and distributive shares. Value theory is then developed into the theory of distribution, which usually occupies most of the latter part of the volume. The chapters on international trade stress the law of comparative costs—a value concept—and even the phenomena of money and credit are

described by some writers as a price or value mechanism. Marshall's elaborate treatise on the *Principles of Economics* is frankly an exposition of value and distribution, and most of the text-books follow similar lines. Is this emphasis a mistake; and has it led the science astray?

There is much to be said in its defense. The outstanding characteristic of modern economic life is the division of labor with its accompanying interchange of products. Exchange is all-pervasive in the industrial system of civilized nations, and every exchange involves a ratio of comparison between the goods exchanged—that is, a value or price. Every productive process is broken up into a series of exchanges; the sale of his product for a price is the goal of every business man's activities; every person's income comes to him as the result of a price set upon his services or upon the services of his wealth in a process of exchange. Go where you will in the doings of the business world, you cannot escape from the processes of exchange and valuation. To explain values, then, is to explain the central fact and universal characteristic of all economic activities. In explaining values it is necessary to explain distribution also; for the distributive shares are the costs upon which values depend. They are important, moreover, as the sources of incomes upon which everyone's economic well-being hangs. These considerations alone justify giving to value and distribution a place of preëminence in economic theory and render it exceedingly unlikely that that preëminence will soon be overthrown. The amount of space given to it in economic texts is further justified by its exceeding difficulty. Values are fixed in a process so intricate, and by forces so numerous and interdependent, that their full explanation baffles the intellect and requires extended and careful reasoning. Many important characteristics of economic life have not this complexity and difficulty of presentation; they can therefore be explained in fewer words. The facts of division of labor, the economies of large scale production, the nature of speculation and insurance, scientific management, the relation of the worker to industry, marketing, foreign trade—such things as these can usually be made clear without much difficulty. While volumes might be written about the technical details of each of them (and other equally important subjects), such elaboration is unnecessary and out of place in a general treatment which aims only to acquaint the reader or student with the fundamental principles of economic life. Hence they are subordinated or briefly handled because their general nature and significance are readily grasped. Other phases of economic activities, less quickly explained, and lying outside

of value and distribution theory at least in part, are the phenomena of money and banking, international trade and public finance. These are usually given adequate treatment, commensurate in length with their importance and difficulty.

There are hitherto neglected economic activities, however, to which increasing attention is very properly beginning to be directed. While it is difficult to conceive of an "institutional economics" which can ever take the place of current economic science, there are undoubtedly many economic institutions whose detailed study by the economist will produce valuable fruit. In the first place, a mere description of the organization and technique of institutions connected with stock and produce exchanges, insurance, corporate organization, marketing and merchandizing, labor management, labor marketing, foreign commerce, banking, will furnish much information of value to the business man and statesman, and helps to build up an applied economics as distinguished from the broader general or "pure" science. In the second place, such study is bound to develop more accurate facts upon which general economic theory can be corrected and further developed. Many of our present generalizations are vague or inaccurate simply because we have not enough specific knowledge to improve them. One field which offers particular promise of yielding generalizations of broad application in the principles of economics is that of insurance and speculation. Risk is almost as all-pervasive an economic phenomenon as exchange, yet it receives singularly inadequate discussion in current theory. In all of these fields good work is now being done by students, but the latter are for the most part technical men with little knowledge of or interest in theory. There is need for more attention to the details of our institutions by general economists, and for more attention to general economics by technical specialists.

Another aspect of economics which is in a very unsatisfactory state is consumption. Where this subject is treated in current writings, the discussion usually consists of a few facts about family budgets, including a statement of Engel's law, a short discourse on the benefits of thrift contrasted with the waste of luxurious expenditure, and not much else. Contemporary critics have rightly deplored this neglect. Consumption is, in fact, an important phase of economic activities. It is at once the guiding force and motivating power by which the processes of production are directed and maintained; and it is the end and goal of it all, by which the efficacy of the entire economic activity of society is to be judged. It is therefore of importance for pure economics in explaining how the business world works, and for

applied economics in appraising its efficiency and suggesting ways of improvement. While very little in the way of constructive contributions to our knowledge of consumption has yet appeared, the awareness of the need for it on the part of many writers is an encouraging sign, and scattered knowledge is being developed which will perhaps provide the material for it. Out of the new discoveries in psychology, the accumulation of statistics, the study of merchandizing, and war-time experience in the control and direction of individual spending it is probable that a more coherent theory of consumption will be added to economics.

Our discussion leads to the conclusion, therefore, that while the theory of value and distribution must retain its place as probably the most important subject-matter of economics, there is to be expected and desired further development of such supplementary topics as those dealing with economic institutions and consumption.

3. PSYCHOLOGY AND THE THEORY OF VALUE

Meanwhile, the theory of value and distribution itself is undergoing an evolution which gives it greater precision and validity, but which does not lead to conclusions so different from neo-classical economics as its critics would have us believe. The theory of value now currently held may be said to be a development of the doctrine of final or marginal utility as first expounded by Jevons, Menger and others of their school. According to this theory in its original form the principle of diminishing utility was said to play the dominant rôle in determining the demand for commodities. Each individual was supposed to have a "margin of consumption" where he weighed the relative utilities of final or marginal increments of commodities, buying a little more of this or a little less of that until the last dollar's purchase of each good brought in a utility exactly equal to that of the last dollar's purchase of every other good. Thus the relative values of commodities were supposed to reflect their relative marginal utilities. Some writers have combined this idea with the classical doctrine of disutility costs, alleging that the utility of each good in the long run is balanced with the relative disutility (in the form of irksome labor undergone or abstinence or waiting endured) of its production. The value finally settles at the point where the marginal utility of the final increment produced just equals the marginal disutility cost of producing that increment.

Probably no economic doctrine has been subjected to more vigorous attack than this one. The criticisms urged against it rest mainly on three general grounds. In the first place it is pointed out that the

analysis of demand contained in the theory is based on a concept of rational, hedonistic consumers whom modern psychology shows to be non-existent. Buyers are not "economic men" who carefully weigh each dollar's purchase against possible alternative purchases; they spend irrationally, foolishly, swayed by various emotions, advertizing, social customs, fads, imitation, and what not. The margin of consumption is therefore a myth which exists only in the imagination of the theorist. In the second place, the idea that values reflect marginal utilities—to the community as a whole, at least—is vitiated by the fact that there are such wide differences in incomes in our society that some persons' desires have much more influence on the market than others'. Even if each individual adjusted his expenditures according to the marginal utility to him of the goods bought, it would not be true that the value of each good would reflect its marginal utility to consumers as a group. Demand is not desire alone, but desire plus purchasing power; therefore the trivial whims of a buyer with large income can influence the market more than the most urgent wants of a poor consumer. So it comes about that limousines have a value as high as that of a workingman's cottage; yet who will say that their utility is as great? No analysis of demand that leaves the purchasing power of consumers out of account can be satisfactory. In the third place, it is objected to the disutility theory of costs that it clearly disagrees with the facts. Monopoly control of supply, the stratification of society into non-competing groups, lack of mobility of capital, and similar conditions result in a marked discrepancy between values and disutility costs. If an agreement among producers maintains a high price for wall-paper, or if strict union membership rules result in a shortage of plasterers which boosts their wages and, consequently, the cost of building construction, high values for these products will prevail which are out of all proportion to the sacrifices of labor-effort, waiting, or other disutility entailed in their production. It is claimed that such cases as these are not temporary exceptions, but universally prevalent, and that therefore the disutility concept of costs is erroneous.

All three of these objections have great force, and render the marginal utility theory of value *in its original form* quite untenable. Yet a due consideration of their validity does not demolish the current theory so completely as its critics believe. For few, if any, economists of repute now hold the marginal utility theory in its original form, and the objectionable features of it that still prevail can be eliminated without doing damage to its most essential parts. The psychological errors of marginal utility are the ones most em-

phasized by contemporary critics. Some have become so sanguine over the possibilities of behavioristic psychology that they believe the whole of current value theory must be thrown upon the scrap heap and a new one constructed upon the study of human behavior. But this would be to undo much useful work of the past, and is quite unnecessary.

The essential fact about the demand for commodities is that the more of a given good that is offered for sale on a given market at a given time, the lower will be the price at which it can find purchasers. This is the familiar law of demand. The marginal utility analysis was merely an attempt to explain the reasons for this undoubtedly true law. It was a working hypothesis to account for an observed fact. If the hypothesis is a poor one, it has nevertheless helped toward an explanation. Its chief contribution is to be found in the law of diminishing utility. Whether human beings are rational or irrational, whatever may be the ultimate motives that control their conduct, they make their purchases in accordance with the law of demand, and the law of diminishing utility is unquestionably one of the forces that lie back of that law. The marginal utility theory erred in assuming that it constituted a complete explanation, and that utilities were evaluated by purchasers in a rational way. Many economists have now discarded both these assumptions, and begin their analysis of value with the law of demand. The law of demand can be attributed to three general facts, the first two of which are now usually recognized, the third implied but not often specifically mentioned. First there is the law of diminishing utility, which, stripped of its hedonistic taint, becomes the really useful contribution of the marginal utility theory. Second, there is the fact of unequal distribution of wealth, which makes it possible to sell a few units of a commodity to persons of large incomes if its supply is limited, but which necessitates lowering the price to be within the reach of buyers with small incomes if larger quantities are to be disposed of. Third, there is the fact of differences in the wants, tastes or desires of the various consumers, which makes it possible to sell a limited supply of a commodity at a high price to those whose desire or need for it is very great, but makes it necessary to lower the price if more is to be sold, in order to bring into the market persons whose desire for the good is small. When analyzed in this way the demand for commodities no longer appears as a rational manifestation of economic men guided by utility, but a mere working out of certain characteristics of human choices which explain their observed tendency to follow the law of demand in a market. Instead of the value settling at a

price which measures the marginal utility of the good, it settles at the marginal price-offer or marginal demand-price, this price being the resultant of the three forces just described. It is now possible to set forth the theory of demand without any taint of hedonism, and without using the much abused phrase "marginal utility" at all. This is the tendency in current statements of value theory, and marks a distinct advance in the direction of greater precision and validity without breaking the continuity of development.

It is difficult to see how any sound objections to this analysis can be urged from the standpoint of psychology. In fact, a complete theory of human choices is not essential to the theory of value. Why men buy what they do is an interesting query, an answer to which is well worth seeking. It will undoubtedly help us to understand better some of the facts of economic life. But for most of the purposes of economic theory the choices can be taken for granted, and their explanation left to the psychologist. The truth is that the rationalistic assumption of human conduct was never necessary to economic theory; it was simply dragged in because hedonism was the dominant philosophy at the time when the earlier economists wrote. We can accept their economic generalizations about demand, because they were based on good observation; but we can correct their psychological explanations to accord with modern psychological views. This is the significance of recent developments in the treatment of demand.

There has been a corresponding improvement in the explanation of the supply side of the value problem. The classical economists correctly observed that there was a connection between values and the money costs of production of commodities, but they were only partly on the right track in seeking to explain these money costs in terms of disutility. The theory of non-competing groups showed the error in this, but gave no satisfactory explanation of costs to replace it. Unfortunately the old term "costs" continued to be associated with the no longer useful idea of disutility, and a new term "expenses" came into use to describe the money outlays which had formerly been regarded as equivalent to disutility costs. But there was no satisfactory explanation of the determinants of these expenses; they were simply regarded as a sort of reflection of marginal utility values. In recent years there has been a distinct advance toward a more adequate account of costs, which is found in the writings of such men as Davenport, Cassel and Carver. By these men the term "costs" is restored to its original meaning of money outlays or "expenses." These outlays are shown to be prices attaching to the various agents of production, arising out of their scarcity on the one

hand, and out of the values of their scarce products on the other. The competition of a great number of opposing demands for goods which are necessarily limited, because their means of production are scarce, sets values on these means of production such that the possible uses for which there is least demand are excluded, the available resources being devoted only to the production of those commodities for which the highest prices are offered. Alternative demands (or opportunity costs) and scarcity are thus the fundamental causes of costs. According to this explanation anything making for scarcity gives rise to a cost. This has the advantage of admitting all the elements entering into costs set forth by older theories, while at the same time including many elements formerly excluded, which nevertheless obviously affect the values of commodities. Thus where disutility does give rise to scarcity, as in the case of the saving necessary to the accumulation of capital, or the danger of particularly hazardous kinds of work, it is recognized in the theory; in addition such causes of scarcity as the limitation of land area, the restrictive policies of trade unions and similar factors are also recognized as sources of cost. Along with this goes the abandonment of the old idea that the rent of land bears a different relation to values from the prices of labor or capital, it being shown that there is no essential difference between the nature of rent, wages and interest in the valuation process. Yet the analysis is perfectly consistent with the Ricardian idea of rent as a differential measuring the superiority of one piece of land over another, while it answers satisfactorily many of the knotty questions and inconsistencies involved in the older statement of the theory of rent. The scarcity theory of cost also has the merit of agreeing with the business man's use of that term. There are still details of the theory which require further working out and more careful statement than they have yet received, but it appears to present the main outlines of a satisfactory explanation, and developments on the supply side of the value problem in the immediate future will in all probability build on this foundation.

4. MARGINISM AND THE THEORY OF DISTRIBUTION

Since distribution is by its very nature a phase of the valuation process, its theory has been passing through an evolution parallel with that of the theory of value. As the classical theory of value was almost entirely a supply analysis, so the theory of distribution that accompanied it paid but little attention to the demand for the agents of production. Rent was the differential product of superior lands, closely associated with the principle of diminishing returns; interest

was a payment just sufficient to reward the abstinence of saving; wages were fixed at subsistence by the iron law; profits were regarded as identical with interest or explained (following Walker) as a kind of rent of superior ability. The marginal utility theory of value shifted attention to the side of demand, leading to the marginal productivity theory of distribution. It was observed that agents of production are wanted for their contribution to product. The product, however, depends on the relative proportions in which these agents are available. The old law of diminishing returns was seen to be applicable to this situation, and was extended to all the agents of production, becoming the law of diminishing productivity or the law of variable proportions. Since the addition to product to be obtained by the addition of successive increments of any productive agent becomes steadily less as more is added, it appears that a point must be reached where every enterpriser finds it unprofitable to proceed further. Competition among enterprisers for the available supply of the agent tends to force them to pay a price equal to the value of this marginal contribution to the product. Thus the share of income of each agent of production was explained as being determined by the value of its marginal product. As first introduced to English readers by Professor J. B. Clark, the analysis was solely a demand analysis, the supply being taken for granted. It is often characteristic of a writer who gets a new idea that it assumes such exaggerated importance in his eyes that he thinks it a substitute for previous theories on the subject, instead of merely supplementing them. Perhaps this accounts for the neglect of supply factors in this case. Inasmuch as these factors are important to the determination of the marginal product, however, it was soon realized that forces influencing the supply of the agents of production were important to the theory. Later writers therefore introduced the supply analysis of classical theory, slightly modified in the direction of greater accuracy. The shares of distribution now were said to be determined by the equilibrium between the supply and demand factors. Each share was still said to be determined by its marginal product, but this in turn was explained as depending on the supply, as fixed by the quantities of each sort of land available, the willingness of people to save, the operation of the principle of population in the various labor strata, affected by the standard of living of each group, etc. Thus the new theory was reconciled to a very considerable degree with the old, the two being blended into a complete demand and supply explanation. This, in its broad outlines, may be said to be the theory of distribution now generally held by economists.

Does it represent real progress in economics, or has it been fruitless endeavor? Many critics regard it as an elaborate system of abstractions, devoid of reality. The idea of marginal productivity is especially assailed, it being alleged that since all products are the joint result of all the productive agents working in inseparable combination, the product of one cannot be demarcated from that of another. How is it possible, for instance, to tell what part of the product of a steel mill is attributable to the laborers, what part to the land, and what part to the capital employed there? The answer is that it is impossible, of course; but the theory does not imply any such separation. It is unfortunate that, as originally advanced, this theory was given the name *specific* productivity. The term implied, and Professor Clark definitely asserted, that the share of income going to each agent is its virtual product. It implied also an ethical justification of the present system of distribution; for if it could be said that each agent of production got just what it produced, it could be argued with some force that there was no exploitation. To this justification there was rightly made a vigorous protest. As a matter of fact, neither implication is essential to the theory, and when it is correctly stated they cannot be read into it. For this reason the phrase *marginal* productivity is greatly to be preferred. When it is said that labor is paid according to its marginal productivity, what is meant is not that labor gets what it produces as contrasted with what is produced by capital and land, but that it is paid *according to its value to the employers* who are bidding for it in a competitive market. That value is determined by the gain or loss in product which will be caused by the employment of a little more or a little less labor; for if any employer could by employing a little more obtain an addition to his product which would yield more revenue than he would have to pay in wages to get it, he would bid for that labor, and this bidding would go on until wages had been forced up to the point where no employer could increase his net gains further by bidding higher for labor against his competitors. At this point all the labor would be employed at a wage that measured the value of its marginal product. The reasoning is the same with regard to the income from capital or land. This tells us nothing about the total product of labor, of capital, or of land; nor is it a justification of their shares. It is purely a scientific explanation of the forces fixing market shares of income, and not an ethical defense thereof. When properly stated, therefore, the theory is not open to objection on this score.

It is also objected to the marginal analyses of both value and dis-

tribution, however, that the whole concept of margins is artificial, exaggerated, and confused. Some critics argue that it is unreasonable to regard an insignificant marginal unit as of such decisive importance as to determine the value of all other units; but this criticism displays an ignorance of the real function of the margin in the theory. The marginal units have no mystic potency not possessed by other units. The value of any good, or the share of any agent of production, is determined by the total demand for it over against the total supply; in the final determination of the price every buyer and every unit of the supply is of equal significance; but in a competitive market there is only one price at which the market can be cleared and equilibrium established. The marginal concept merely tells us what that price is. The margin itself is established by all the buyers and all the sellers. As Professer Marshall has well put it: "The part played by the net product at the margin of production in the modern doctrine of distribution is apt to be misunderstood. In particular many able writers have supposed that it represents the marginal use of a thing as *governing* the value of the whole. It is not so; the doctrine says we must *go to the margin to study the action of those forces which govern* the value of the whole: and that is a very different affair."[1] Another recent critic[2] has ridiculed the multiplicity of margins in current theory, and claims the different uses of the term are inconsistent. Thus we have marginal utility, marginal productivity, intensive and extensive margins of cultivation, marginal cost of production, and so on. At one time the margin is the point *at which* a distributive share is fixed (as when interest is said to be determined by the marginal productivity of capital); at another it is the point *from which* it is measured (as when land rent is said to be the surplus above the margin of cultivation). In this criticism there is apparent a misconception of the nature of a margin. A margin is simply a borderline or limit, and the term could be applied to almost any economic situation where a choice between alternatives has to be made or where limiting conditions are found. Since there are naturally a host of such situations in the economic system, the number of margins is numerous, and we cannot escape them if we would. If we were to abolish the term we should only have to invent another to replace it. It is as foolish to object to the consideration of margins in economic theory as it would be to object to the existence

[1] A. Marshall, *Principles of Economics*, 7th ed. Book V, § 5, 410.

[2] O. F. Boucke, *A Critique of Economics*, 1922.

of twelve edges on a cube. The truth is that economic theory does not begin to take cognizance of all the economic margins that there are; but has selected a few general types that are of peculiar significance for its problems. Nor is there any inconsistency in measuring distributive shares as differentials above a margin or as products at a margin. It has been shown very neatly by Professor Carver, in his *Distribution of Wealth*,[1] that land rent as a differential is the same thing as land rent viewed as the marginal product of land, and Clark pointed out the same fact when he first advanced the specific productivity theory. It is one of the virtues of the marginal productivity analysis that it harmonizes with the Ricardian theory of rent, and admits also the classical ideas of population, abstinence, standards of living, labor disutility and so on as supply factors entering into the determination of distributive shares. When two independent lines of reasoning lead to conclusions in harmony with each other, the probability of truth in those conclusions is thereby strengthened.

Recent developments of the theory of distribution, as exemplified in the marginal productivity theory, therefore, may be regarded as a distinct advance in a number of respects. The one-sided supply analysis of classical economics has been blended with the equally one-sided productivity analysis into a well-rounded whole. The cruder term specific productivity, connoting the separation of inseparable joint-products and the ethical justice of competitive distribution, has been replaced with the more scientifically precise and unobjectionable phrase marginal productivity. The theory has also been bettered in many details. The iron law of wages has given way to a theory which admits the influence of standards of living and various hereditary and environmental factors in determining the wages of the different labor-strata; while the psychological and productivity factors in the determination of interest are being more carefully considered and their influence allowed for. Mention should also be made of the theory of profits. A great advance has been made over the classical theory, which regarded profits as almost synonymous with interest and explained them as a rapidly decreasing residual share. Emphasis is now placed on the strategic position of the enterpriser, who, as the risk-taker and director of industrial processes, acts as the shock-absorber of the industrial system. This makes profits a dynamic, very fluctuating share of income, bringing to the enterpriser the results for good or ill of the constant changes going on in industry.

[1] 190–202.

In accordance with the general point of view expressed at the outset of this article, the discussion of the current theory of distribution has tended to uphold it as a progressive improvement built up out of older and cruder theories; but it is not to be regarded as perfect or complete. The evolution is bound to continue. One improvement to be desired, and which would go far to meet the objection that the present theory is abstract and unreal, would be the focussing of greater attention upon specific rents, profits, wages and interest rates instead of confining it so largely, as at present, to the more general determination of those incomes. In current discussions the theories of wages and interest, particularly, are frequently if not always presented as if there was a "general rate" of wages and of interest, whose discovery is the task of the economist. If any differences in wages and interest are recognized, they are treated as exceptions or qualifications of the general theory. The truth is, of course, that there never has been a "general" rate of interest or of wages. There are as many rates of each as there are kinds of work or types of investment, just as there are many rents of land and types of profits. There are *general principles* applicable to all wage and interest rates, perhaps, but that is all. The correct approach to all value and distribution theory seems to the present writer to require a clear recognition of diversity in the prices of goods and distributive shares as the normal thing; then there should be included in the theory every important factor influencing particular prices, rents, wages, interest rates or profits. Such an analysis will seem much more real than those now current and will be much more useful in explaining the actual facts of the world. It will not require an overthrow of existing theory, but merely some additions to it, and a slight rearrangement in its presentation.

Another step forward that now seems needed and possible is a closer reconciliation of the theory of distribution with that of costs. The two theories are, or should be, really one; yet in few cases is the cost analysis presented in the theory of value well linked up with the theory of distribution. Marshall's treatise must be excepted from this criticism; but since his theory of costs is open to serious objections, his analysis hardly meets the need. There is opportunity for a keen study that will clear up the whole question of costs and distributive shares.

5. THE METHOD OF ECONOMIC THEORY

The economist has always been limited in his generalizations about society by the fact that he has had to work with imperfect tools.

Where the chemist or physicist deals in tangible things which he can examine in his laboratory under rigidly scientific conditions, and where even the biologist or the psychologist can use the experimental method and obtain quantitative data in a great deal of his work, the economist is dealing with a complex, unapproachable mass of phenomena which to a great extent he can study only by contemplation at a distance and by reflection upon the somewhat untrustworthy observations so made. Until recently, therefore, economics has been very largely a deductive science. The fact that it has been so has seemed to some persons sufficient reason for rejecting its conclusions. Yet the matter is not quite so simple as this. Deduction always has been and probably always will be an important method of scientific generalization in every field. Few sciences lend themselves more readily to the inductive method than physics; yet one of the most important recent discoveries in this field, the Einstein theory of relativity, is a purely deductive achievement. His novel proposition that light is refracted by gravitation was arrived at by deductive reasoning; and this revolutionary pronouncement has been since verified by observation of the stars during the time of the sun's eclipse. The economist's reasoning cannot always be so neatly demonstrated; but it may be none the less reliable. Careful reasoning from sound premises should lead to valuable and truthful conclusions. In the absence of the possibility of laboratory experimentation the economist is justified in approaching his subject-matter by this means, and the carefully sifted results arrived at by generations of keen thinkers checking each others' results is not likely to be wholly useless. The main body of economic doctrine is not, therefore, lightly to be cast aside because it is the product of deduction.

On the other hand, induction is a valuable aid to any science where it is possible to employ it. The difficulty with deduction is that it does not often admit of *exact* results. It is a qualitative rather than a quantitative analysis. Generalizations arrived at inductively, however, from carefully measured known facts, lead to precise, measurable conclusions. As a supplement to, but never as a complete substitute for deduction, therefore, induction has great utility. The economic theorist can reason with confidence that if competition prevails wages will equal the value of the marginal product of labor, and he can also say *in what direction* wages will be influenced if restrictive trade unions limit the number of laborers in a certain trade; but he can never say positively *to what extent* competition is effective, or *to what extent* restrictive trade unions interfere unless he can find means of measuring these things in the world about him.

He can tell us that interest will be relatively low and land rents relatively high if capital is plentiful and land is scarce, but he cannot say *how* low or *how* high unless he is in possession of all the facts; and these he can never obtain by deduction. The point now being stressed, that economics is in need of more inductive material, is, therefore, well taken; but it is naïve to expect that a new science can be built from the ground up by this means, and an entirely different set of generalizations arrived at to replace those now generally established. The probabilities are that the inductive material, when it is gathered, will serve to confirm most of the existing theories, while causing, no doubt, some modifications and shifting of emphasis here and there.

The chief source of inductive material for the economist, for a long time, at least, will be statistics. The tendency to make use of more statistical data is therefore one of the really important recent developments of economic theory. There is almost no part of the science in which some work along this line has not been undertaken, and further investigations are now being pushed in every conceivable direction. A noteworthy example of this is the gathering of information concerning business cycles which is being done by a great number of investigators. The development of index numbers is giving to economists a useful measuring rod with which to keep an accurate account of many important developments in the industrial world. War-time price control has supplied a considerable amount of data on prices, but our information in this field is still very meager. This lack undoubtedly will be remedied before long. The organization of research bodies, such as the National Bureau of Economic Research, is a significant sign of the new interest in accurate economic information. That body's estimate of the income of the United States, and more recently of unemployment, has given us facts about the distribution of our income and concerning unemployment which are reliable, and of immense value. Notwithstanding the notable progress in gathering the facts about our economic life that has been and is being made, our information is still very inadequate. The science of statistics is only in its infancy. There is every reason to believe that the comprehensiveness and accuracy of statistics-gathering by both governmental and private agencies will be tremendously increased in the immediate future and that the statistical method will occupy an ever more important place in economics. Its greatest value, however, seems likely to be not in building up new theories so much as in giving us the data which alone makes possible

the application of our existing theory to economic problems of control and reform.

There has been much controversy among economists as to whether economics should pursue a static or a dynamic method. The practice of some theorists who base their analysis on the assumption of a static state has been harshly condemned as artificial and so unreal as to make the resulting generalizations of no validity in the actual world. Some critics go so far as to say that economic conditions are in such a state of change that no observations based on present conditions can be of any permanent value; that in fact no general economic laws can be found. They would make of economics an evolutionary or historical science, which attempts to understand present institutions by a study of their past development, and on the basis of that knowledge to predict and further their continued growth. The opposition to static studies goes along with the objections to deductive reasoning, and these who favor evolutionary studies in general advocate also that general broadening or shifting of the subject-matter of economics to a general survey of economic and social institutions which was referred to above. In opposition to this point of view it should be pointed out that there is no such thing as an evolutionary science, strictly speaking. The essence of science is its method, and the method is simply the development of logical generalizations from careful observations. This method can be applied to any body of subject-matter about which careful observations can be made; a science, therefore, may study things as they are or it can study their historical development—both are equally scientific and both may be useful. It is probable that some aspects of our present economic life can best be understood by studying their present behavior; others may be best understood by studying their history. Inasmuch as accurate historical facts are exceedingly difficult to establish, however, it is reasonable to believe that more reliable knowledge is to be obtained from observation of present facts than from studying the evolution of economic institutions. Certainly the attempt to saddle the historical method exclusively upon economics is foredoomed to failure and would be a step toward conjecture and opinion instead of toward objective scientific knowledge.

On the other hand, economic theory, to be of value, must describe economic phenomena as they actually exist, and not as they might exist under some hypothetical set of conditions imagined by the theorist. In attempting to use the deductive method in such a description, however, the device of the static state, rightly employed, is

a helpful and legitimate expedient. Every scientist makes use of something of a similar sort. The phenomena of the world are complexly built up of many interacting forces. Scientific analysis requires that they be broken up into their elements in order that they may be more easily understood. The physicist studies the force of gravity by creating in his laboratory artificial conditions which do not exist in the world outside. He allows an object to fall in a vacuum tube in order that he may observe the influence of gravity upon it undisturbed by other forces. He arrives at a law of falling bodies which sets forth that a body tends to fall sixteen feet the first second, thirty-two feet the next second and so on. But in the actual world no body falls quite that way; the resistance of the air, the direction and velocity of the wind, possible intervening tree branches, and other influences modify its motion. Is the physicist's law therefore false? No, it tells us correctly how *one* force acting upon a falling body works; other laws tell us what to expect from *other* forces. In predicting what a given body will do in a given set of conditions, we must find the resultant of all the forces that will be acting upon it; we would obtain a wrong result if we considered the force of gravity alone. The static state is the economist's substitute for the experimental conditions of the physicist's laboratory. It is his vacuum tube. He must construct in his mind the simplified conditions that the physicist realizes in his experiments, in order that he may analyze one factor at a time. His resulting generalizations give an accurate account of *one set of influences* acting upon economic phenomena in the actual world. But it must be borne in mind that in that world *other modifying influences* will also be found, which must be taken into consideration if the analysis is to be used in formulating any program of economic conduct or control. Used in this way, and with a proper understanding of its limitations, the static analysis, which proceeds on assumptions of perfect competition, economic motives, absolute mobility of labor, capital, etc., is legitimate and leads to generalizations of value. It must be conceded, however, that the device has been abused by some theorists, who, having made the assumptions at the beginning of their analysis, forget to consider at its conclusion the modifying influences, and accept as true generalizations which ought to be considerably qualified. For this reason the criticisms directed against the abstractions and oversimplifications of economic theory are partly justified, and will have the useful effect of forcing a more careful statement of some too hasty generalizations. A development of economic theory to be expected in forthcoming treatises will be a

more cautious statement of generalizations, and the setting forth in particular detail of all the factors affecting a given situation. Economic laws will be stated as *tendencies* (as all scientific laws should be stated); and in the analysis of any particular problem, the resultant of all the tendencies acting upon the situation will be considered.

6. ECONOMICS AND WELFARE

Economics in its beginnings was avowedly a study dealing with questions of welfare. Adam Smith's *Wealth of Nations* was aimed primarily at discovering the means by which national prosperity could be obtained. Many other writers, such as Malthus, List, Bastiat, Marx and Mill—to mention only a few—were interested in the effect of economic activities upon general well-being. Recently there has been a tendency for economic theory to become more purely descriptive, analyzing the phenomena of economic life in a colorless, impersonal way, relegating the consideration of questions of public policy, or the goodness or badness of existing institutions, to the background, or omitting them altogether. Some regard this tendency as a mark of progress; others decry it as a sign of decadence. The first group believe that it indicates a more really scientific study of economic phenomena; the second feel that it robs economics of its vitality and significance, making it a dry exercise in dialectics instead of an interesting and important contribution to human improvement. They would make economics a science of welfare, rather than a science of wealth.

The controversy is really beside the point; for the question at issue is not so much whether or not economics should deal with matters of welfare as it is by what means we can best go about it. While many scientists are doubtless actuated primarily by curiosity and other disinterested motives, and while many particular scientific researches have no apparent practical application, the ultimate reason and justification for the great mass of scientific investigation now being carried on by the human race is undoubtedly its usefulness in promoting the welfare of mankind. Chemistry and physics are welfare sciences, for they give us means of controlling natural forces to our manifest advantage. Biology and psychology have their distinct welfare contributions. Even astronomy has some practical usefulness and may eventually have pragmatic applications not now dreamed of. A science of economics which has no welfare interest is likewise unthinkable. Probably no economist has any desire or intention to set up such a science. The great interest shown by thinking men in the subject must always be prompted in great

part by the momentous possibilities for solving important human problems that it holds. Economic science must show us ways of increasing the prosperity of the race if it is to justify its existence.

But in approaching problems of economic welfare the surest procedure is to make a clear separation of pure from applied science. Pure science confines itself to accurate description of phenomena; it explains what is and how it works and what are its effects, but it does not concern itself with what ought to be nor tell us whether the effects are good or bad. Such purely descriptive knowledge, impartially arrived at by disinterested observation, is a necessary preliminary to the solution of any problem, whether it be of industrial chemistry, agriculture, medicine or economics. Applied science takes the knowledge acquired from pure science and applies it to such problems. Pure science furnishes the tools with which applied science works. The two go hand in hand; but the former must precede, for without it the latter is without the proper means for the accomplishment of its task. The distinction between the two is especially important in economics, for if an attempt is made to do both things at once in this field serious error is likely to result. We can never hope to solve the pressing economic problems confronting the world without a thorough, reliable, unbiased understanding of the economic system as it now is, and a knowledge of how it works. We are not likely to get such an understanding and such knowledge if we attempt to study the industrial structure with preconceived ideas as to its goodness or badness and as to the improvements that ought to be made upon it. Only biased observations and unreliable conclusions result from such a method. The cool, careful analysis of the disinterested investigator, pursuing for the time being, at least, knowledge for knowledge's sake, without any intruding ideas about welfare, is the surest way toward the ultimate promotion of economic well-being. The economics of the classicists, with its apologies for the present system, its defense of laissez-faire, its sweeping assertions about the impossibility of raising wages, and so on, was pseudo-science (in spite of its many real achievements) because it made the mistake that some misguided reformers would now like to see repeated. The growth of a purely descriptive economics, which presents the present system as it is, which is content to give us the laws of production, value, distribution, and so on without consideration of their moral or welfare effects, is an encouraging sign. It represents a forward movement in the development of the science.

The truth is that heretofore we have hardly had enough eco-

nomic knowledge to attack problems of welfare intelligently. The trouble has been not a lack of interest in social improvement, but a lack of the very kind of purely descriptive science that some reformers now object to. With the development of pure economics we can now look forward to real progress in the development of applied economics. Once having stripped economic laws of their ethical bias, really understanding the nature of things as they are, we are in a better position to locate defects and find means for their removal. There is already much good literature in the field of applied economics. A great deal more that is better is sure to be produced in the next few decades. There need be no anxiety lest not enough attention be paid to welfare. But it is necessary to stress the importance of reformers first acquiring a thorough knowledge of pure economics if they are to achieve useful results. A division of labor between the analytical, descriptive work of economics and the applied welfare-seeking activities is altogether good, but the two groups need to keep in touch with each other. Let us keep pure economics as a science of wealth; then alongside it we can develop the applied science which considers the relation of wealth to welfare.

7. THE TERMINOLOGY OF ECONOMIC THEORY

One of the chief difficulties with economic theory at the present time is the confusion of terminology that prevails. Our nomenclature is in a decidedly unsatisfactory state. Such words as value, capital, rent, interest, wealth, cost, profits, and others—all among the most everyday concepts of economics—are used in widely different senses by different writers, and in senses varying oftentimes greatly from popular language in the world of business and on the street. Moreover, there has been much fruitless controversy as to the proper definitions of these terms, without as yet any noticeable approach toward agreement. This is a deplorable state of affairs which it is to be hoped will not long be allowed to continue. Its satisfactory solution would go far to increase popular esteem for the subject, and to deprive critics of economic theory of one of their strongest arguments.

A precise, technical vocabulary is essential to every science. Without it accuracy of thought and reliability of conclusions is impossible. Inasmuch as the use of terms in everyday language is always more or less vague, it is inevitable that this vocabulary should be somewhat different from that of the man on the street. There are two possible ways of securing such a precise terminology. One way is to invent it, as for instance by the construction of new words

from Latin or Greek roots. This method is largely followed by biologists, who replace or supplement such vague general words as fly, spider, etc. by the more precise terms *musca domestica, araneida,* and so on. The other way is to select common words to which more precise, technical meanings are given than belong to them in everyday language. Such a method is largely followed in physics, where such terms as *mass, energy, volume,* etc. are defined somewhat differently from common usage. Economics, probably because of its non-technical origin, has adopted this latter method, beginning with everyday words vaguely defined, and gradually narrowing and sharpening their meaning. There is much to be said in favor of newly-invented terms, since they are less likely to be confused with popular language, and it is possible that economic reasoning could be more easily handled by the introduction of some words of this sort. The complete adoption of such a terminology, however, would be too much of a break with established usage to stand a chance of success. It may be taken for granted, therefore, that popular words with technical meanings must continue to supply the bulk of the economist's vocabulary. Upon this basis any attempt to straighten out the present confusion must be made.

A first essential to bringing order out of chaos in this matter is a clear recognition by economists of the distinction between *differences in underlying ideas* and *differences in terms.* Failure to recognize this distinction has been responsible for many a fruitless controversy. The importance of the distinction is well brought out by the current disagreement concerning the things to be included under the term capital, in the discussion of which two quite different issues have been hopelessly confused. One has to do with whether or not land possesses economic characteristics essentially unlike those of artificial wealth. The dispute on this point hinges upon a fundamental difference in underlying concepts. The other has to do with what usage of the word capital is most convenient, and is purely a question of terminology. Whether land differs from other kinds of wealth is one question: whether capital should include both land and other kinds of wealth is a quite separate question; yet few discussions of the matter show an appreciation of this fact. Those who favor the broader use of the term capital, for the most part, have appeared to feel it necessary to attempt to overthrow all the older teachings regarding the peculiar nature of land, and have thereby weakened a good argument in favor of their terminology; while those who recognize the unique position of land in economic affairs have erroneously concluded that in demonstrating this they have disposed

of the argument in favor of a new use of the word capital. The truth is that if there are good reasons for including all kinds of wealth under the term capital, it is still possible to give recognition to differences between various kinds of wealth by classifying capital into as many varieties as may be necessary. Thus a separation of questions of underlying ideas from questions of the mere use of words can help to clear up a difficult issue. A similar confusion of these two questions is illustrated by the historical controversy concerning what is productive and what unproductive labor; it is also found to-day in the disagreements concerning the use of the terms value and price, rent and interest, costs, and so on. In arriving at a more satisfactory terminology, therefore, economists will need to avoid this confusion by considering first, entirely apart from the question of terms, what are the fundamental economic concepts for which terms are needed? When this is settled—and not until then—it remains to be decided what words are best suited to express these concepts.

In considering the latter question, the rule should be adopted that, so far as is possible, words should be used in their popular meanings. Since economics is practically committed to a vocabulary made up of everyday words, it is desirable to distort their everyday significance no more than is absolutely required in the interests of scientific precision. In sciences with which the layman is little concerned, such as physics, it matters little if common words are used in a technical sense which is greatly different from ordinary language. But every business man, every legislator, and even every newspaper reader is perforce something of an economist. He is bound to have economic concepts continually brought to his attention; and since it is hopeless to expect that he will master the science in a technical way, if he continually meets with terms into which he reads a different meaning from that which prevails among economists, serious confusion and error is inevitable. If the business man reads economic writings which discuss such things as capital, profits, rent, and so on, these terms being employed with meanings entirely different from those to which he is accustomed, he will either fail to recognize this and be led thereby into error; or, recognizing it, he will throw the book away in disgust, regarding it as one more evidence of the hopelessness and impracticability of theory. The tendency now manifest on the part of some economists to bring the terminology of the subject into harmony with the language of business men is therefore a mark of progress. Examples of this are the definition of capital as a stock of wealth of any kind instead of intermediate wealth only, the

use of costs in the sense of enterprisers' outlays instead of disutility, the employment of the terms rent and interest as two different ways of viewing the income from capital instead of confining the first to land and the second to artificial instruments of production, and similar innovations. The conservative inertia of economists who have been brought up on a diet of other definitions makes the new uses unpopular and slow of adoption; yet their acceptance would improve the science, and help to make it more intelligible to the layman.

It is time to consider whether or not some concerted action by economists looking toward the standardization of our terminology cannot be undertaken. If a committee of the American Economic Association, preferably in collaboration with a similar committee from our British colleagues, were to overhaul the entire vocabulary of economics and adopt a standard set of definitions for terms, the present confusion would be replaced by order. The committee should be guided by some uniform general principles, such as those set forth in the above paragraphs; and on this basis could work out a satisfactory terminology. No doubt the definitions adopted would not be entirely pleasing to anyone, but they would have the advantage of uniformity and when economists once became used to them, they would be found to serve our needs well enough. If the definition of capital was too all-inclusive for one writer, he could sub-divide it into classes that suited his purpose, but he would no longer use that word in a sense different from that of other writers. In this there would be a distinct gain. Writers who were not agreed on fundamental concepts would find a way to express their ideas without twisting terms away from their common meanings, and controversies would no longer be mere wars of words, but would be confined, as they should be, to more fundamental things. It is time that economists recognized the profound truth of Shakespeare's familiar saying that "a rose by any other name would smell as sweet."

8. SOME PRACTICAL APPLICATIONS OF ECONOMIC THEORY

Has economic theory made any definite contributions to the solution of the many pressing problems of economic life, or is it, as its critics maintain, a mere academic intellectual game—a cloistered scholastic exercise carried on for the amusement of its initiates? The present writer believes that the great body of economic doctrines now currently taught is a fairly true and illuminating explanation of how our economic organization is constructed and of how it functions—an explanation imperfect and incomplete, no doubt, but on the whole very useful. It should, therefore, be capable of making,

and should have made, important contributions to the meeting of economic problems. It should be pointed out, however, that economics is a general, rather than a particular science. It seeks to find the broadest underlying principles of the industrial process, rather than to describe it in its minute details. Hence it is not always to be expected that an immediate, practical application can be found for every economic law or theory. Failure to find such an application does not condemn as futile the search for such fundamental principles in economics, any more than it condemns the efforts of chemists and physicists to fathom the ultimate constitution of matter, or of astronomers to solve the riddles of the stars. No one can say at what moment the most remote and apparently inapplicable bit of knowledge may not prove of inestimable usefulness to man. Notwithstanding the general nature of economic theory, however, it has many practical applications.

In the field of production the principle of division of labor has important applications. Doubtless much of the development of specialization would have come had there been no economists, but it is quite possible that the emphasis placed upon this principle by generations of economic writers has helped to spread its application in such movements as that of scientific management. The principle of diminishing returns has important applications in agriculture and industry generally, and a clearer recognition of its significance by both national and international statesmen would help to correct many a mistaken political policy. This is true also of the law of population. Economic theory, by calling attention to the advantages of large scale production, is helping to bring about a more intelligent attitude toward big business and is instrumental in correcting an unintelligent governmental policy of indiscriminate trust-busting by the substitution of well-advised regulation. With the growth of nationalized industry that seems to be under way, economic teachings concerning the guidance of production by demand in competitive society are sure to shed light upon the problem of intelligent direction of industry.

In the field of money and credit economic theory has achieved gratifying results. Whether the quantity theory is true or false, we know a great deal to-day about the ways of money, bank deposits and their accompanying institutions that is of immense value to the banker and statesman. The employment of trained economists by so many banks in recent years is sufficient evidence of this. Economists assisted in the devising of the Federal Reserve banking system and in the financial stabilization of other nations. If there

are monetary troubles in the world to-day they are partly because statesmen disregarded the warnings of economists; and the economist alone is ready to show how they may be solved when the politicians are willing to listen to his advice. We have not yet solved the problem of the business cycle, but even here important progress has already been made; and when this difficult phenomenon is under complete control, as some day it surely will be, much of the credit for it can be given to economic theory.

The much-maligned theory of value gives us an understanding of the mechanism of prices whose correctness was well demonstrated by war experience with price control. Economic theory has emphasized the interdependence of prices and the nicely adjusted balance between supplies and demands that is maintained by market adjustments. Attempts at piece-meal price fixation during the war proved how intricate this interdependence is, and how difficult it is to control prices without extending regulation throughout the whole range of prices from first producer to ultimate consumer, and extending it also to the direction of production and distribution as well. War-time price control confirmed in general also the teachings of economists regarding the relation between values and costs. Society has scarcely begun yet to attempt any regulation of the price system; it is likely to do so more extensively in the future, and if we ever adopt socialism an entire new price mechanism may be set up. In this development, the economic theory of value may serve as a useful guide. The theory also is now adequate to solve many an individual price problem and to predict changes of prices, provided the facts necessary thereto are available. That they are not available is not the fault of the theory. They will become more available with the development of statistics, and then the theory of value will find useful applications that are not now possible.

The field of distribution presents some of the most pressing economic problems, inasmuch as inequality of incomes is one of the greatest sources of social unrest. Society has not begun intelligently to cope with the situation. Trade unions have sought to raise the wages of labor by a process similar to lifting themselves by their bootstraps. It is doubtful whether they have had any appreciable effect upon wages in general. A better knowledge of economic theory would have prevented many a trade union abuse and pointed out the path to real wage increases. Economics teaches that under a system of free enterprise there are two possible sources of wage increase: increased general production and greater scarcity of labor relative to the other agents of production. It does not teach that

these are the only sources, but that they are the most fundamental and far-reaching. The movement for restriction of immigration, for smaller families and for higher standards of living is directly in line with this teaching, if not directly inspired by it. So also is the movement for greater efficiency in production, and there is little doubt that the tendency on the part of intelligent trade union leaders to abandon restrictive practices and to coöperate in increasing the efficiency of labor is a result of better knowledge of economic forces on their part. Economic theory affords a basis for discriminating between earned and unearned incomes and its principles are seriously considered in the levying of taxes and the formulation of programs of social reform. A fair-minded consideration of the problem of inequality must lead to the conclusion that the economic theory of distribution can and will contribute much toward its solution.

Although not all economists are agreed upon the best policy of international trade for a nation, the theorists on both sides have strongly influenced tariff legislation in many countries. The free trade policy of Great Britain is partly attributable to the teachings of Adam Smith without doubt; while protection in Germany and the United States has borrowed support from such economists as List and Carey. The disastrous situation of international trade in Europe to-day would be much less serious had its statesmen been more willing to heed the advice of economic theorists. To the distressing problem of German reparations and international indebtedness economics alone can present an answer; the ignoring of the economics of the situation that has characterized the policy of some of the nations has led to conditions which only emphasize this fact more clearly. The substantiation of the predictions of Keynes and other economists as to the probable effects of the Versailles treaty furnish remarkable evidence that the operation of international economic forces is well understood by economic theorists. The ease with which the United States has swung from a debtor to a creditor position, and the general understanding of the nature of the change on the part of the community is also not a little due to the knowledge of international trade processes furnished by economic theory.

Finally, economic theory contributes to an understanding of the social organization as a whole, and to our knowledge of means for its improvement. By instructing us as to the underlying forces which direct and govern economic processes without any consciously arranged central plan, it gives us the knowledge necessary to judge of it merits as well as its defects. Liberalism as a philosophy of social organization draws its arguments chiefly from economic theory.

Single Tax, Anarchism and Socialism as proposals for the reconstruction of the social organization do likewise. If we can be said to have any conscious general social policy to-day, or any program of progressive evolution, it is based on the teachings of economics in so far as it deals with economic affairs. The laissez-faire doctrine of Adam Smith and his followers permeates the thought of many political philosophers and more vaguely, perhaps, business men of to-day. To a great extent modern constitutions and governmental policies are based upon it. If in the future there is a continuance of the present trend toward greater collective control and coöperative industrial organization, it will be largely because of defects in the bases of our present structure revealed by economic theory. In carrying out the details of any such collective organization, moreover, economic theory will have to be drawn upon as a guide.

9. DIRECTIONS OF PROGRESS

The foregoing analysis of recent developments in economic theory has tended to demonstrate the soundness of the point of view expressed at its beginning. The survey has shown how economic theory is now undergoing a progressive development toward greater completeness and accuracy, not by being re-created from entirely new beginnings, but by gradual elaboration and modification of its original conceptions. The improvements resulting from this process that have been outlined may here be reviewed briefly. In the theory of value the crude cost doctrines of the classicists and the extreme hedonistic marginal utility analysis of the subjective economists are giving way to a more objective representation of the forces of supply and demand freed from faulty psychology. Values are shown to be fixed on the one hand, by the law of demand, resting in the choices and purchasing powers of consumers, and, on the other, by costs of production, resting in scarcity of the means of production. Distribution, likewise, is no longer viewed exclusively from the side of demand or supply, but the two explanations are brought together, each share of income being fixed by marginal productivity of the agent, which in turn depends on the scarcity of that agent in proportion to the other means of production. The erroneous physical and ethical implications of the phrase specific productivity are being discarded. Alongside of the deductive method of older economic theory the growth of statistics is making available a new means of approach to economic analysis which is being made good use of in a number of inductive studies, and is producing facts with which to correct economic theory and to make possible its application to con-

crete problems. There is manifest an excellent tendency to separate the purely descriptive aspects of economics from its ethical, welfare aspects, making for more unbiased and accurate statement of economic principles and laying the foundations for a more scientific applied economics. Some progress is also being made in bringing the terminology of economic theory into harmony with the language of business, but much confusion in the use of terms among economists still prevails. These developments represent real progress, notwithstanding the opinion of some critics to the contrary. That they have given us a science of economics of real usefulness appears evident from the sketch that was given of its practical achievements and possibilities.

It is to be expected and desired that a further progressive development of economic theory along similar lines will take place in the future. That which is good in the older theory should be retained, but additions to it are needed which will fill in some of the gaps and overcome some of the difficulties now manifest. Value and distribution must retain their important place as the center of theory, because of the universality of exchange in all phases of economic life; but other branches of economics should be further developed, such as a detailed study of the principles underlying many of our economic institutions as yet not fully understood, as well as a more satisfactory analysis of consumption. The somewhat hazy relationship between costs and distributive shares is the phase of value and distribution theory most in need of further light. Better organization of statistics-gathering facilities is an important work containing great possibilities for increasing the usefulness of economics. From it may come many excellent inductive studies to supplement the deductive reasoning of theorists. Also the knowledge of facts about employment, efficiency, income shares, prices, and other phenomena that it gives us will afford the material for an applied science of economics that is not now possible. Nothing gives greater promise for the science in the immediate future than this. This applied economics must be developed parallel with but distinct from pure economics as a merely descriptive science. Merging ethical considerations with the formulation of general principles is to be avoided as unscientific and dangerous to the finding of truth. A much needed measure of reform is the standardization of the economist's vocabulary along the lines suggested, and it is to be hoped that such a work can be undertaken by a competent body which will command the respect of all.

These are some of the directions in which it seems possible that

progress in the further development of economic science can now be made. If the foregoing discussion has defended many of the past achievements of economic theory, it nevertheless has frankly recognized the existence of many things still needed, and pointed a way of approach to their attainment. Economics is not a finished, dead product whose perfection leaves no new paths for the eager seeker to find. There is opportunity for much valuable constructive work, but it is to be done not by destroying what has been built by years of careful workers' endeavor, but by building on the sound foundations which they have laid.

THE ORGANIZATION AND CONTROL OF ECONOMIC ACTIVITY

by

SUMNER H. SLICHTER

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THE ORGANIZATION AND CONTROL OF ECONOMIC ACTIVITY

1. INTRODUCTION

When Adam Smith wrote *The Wealth of Nations,* he regarded the organization and control of economic activities as the paramount economic problem of the day. The problem of value, as we are accustomed to conceive it, did not occupy the position of importance in his mind which it now does in the minds of most economic theorists. To Smith it was by no means *the* problem of economics and it was not treated as such in his book. He wrote his treatise with the primary purpose of expounding the merits of a particular system of industrial control—that of free capitalistic enterprise.

What was true of Smith was true also of the principal of his immediate predecessors and contemporaries. The problem which interested them was not how value is determined but how the existing guidance of economic activity could be improved. In the case of Boisguilbert and Vauban this problem shared with that of taxation the center of attention. In even greater degree were Cantillion and the Physiocrats interested in perfecting the methods of regulating industry. They believed in a "natural" economic order and to discover and describe it was their supreme purpose. Thus modern economic thought can be said to have arisen primarily out of the efforts of eighteenth century economists to answer the question of how industry should be organized and controlled.

Adam Smith's book appeared during the early stages of the industrial revolution. Since then, industry has changed more rapidly and more completely than ever before in a like period. Specialization, to which Smith attached such great importance, has been carried to extremes of which he scarcely could have dreamed. Science, which was only beginning to be applied to industry when *The Wealth of Nations* appeared, is now extensively used in all branches of production. Machinery, to-day the dominant technique in many industries, had not yet come into general use. The corpora-

[1] The writer desires to acknowledge the helpful criticisms of his colleague, Dr. M. A. Copeland, and of Professors J. R. Commons, H. A. Millis and Jacob Viner.

tion was an exceptional form of organization which Smith did not regard as serviceable under most circumstances. The trade union existed but was not yet important, and the coöperative movement had not started. The credit system was still in a rudimentary stage, and commercial and investment bankers had not acquired the extraordinary influence which they to-day possess. The trade association and the employers' association, as we know them, were unimportant.

Since Adam Smith's time, economic theory has also undergone great change. The alterations, however, are for the most part traceable to the development of neither industrial technique nor industrial institutions. So far as theory of the prevailing type is concerned, the radical transformation of industry, which we call the Industrial Revolution, might never have occurred. Orthodox doctrine is formulated with as little reference to such things as machinery, science applied to industry, corporations, trade unions, coöperative organizations, trade and employers' associations, the credit system, commercial and investment bankers, as were the theories of Adam Smith. Tradition has established, as the proper method of theory, deductions from hypothetical and drastically simplified premises rather than inductions from observations, the study of case material, or the use of statistics; and has caused its students to feel no necessity for checking doctrines by reference to the facts—a process regarded as quite essential in all other sciences. Furthermore, it has rendered theorists content with extremely general and highly abstract explanations of economic phenomena. Although the quest for a "natural order" has long since been abandoned, not only do theorists search persistently for natural laws which operate independently of human arrangements but they consciously endeavor to prevent social institutions and usages from intruding themselves into the formulation of economic doctrines.[1] In all branches of theory one finds this satisfaction with extremely general and highly simplified explanations and this disinclination to take account of the many complicating circumstances of economic life. Theories of value are put in terms of abstract supply and demand with little or no inquiry into their determinants beyond a very general and unrealistic analysis of pains and utility. The influence of market organization and institutions upon value is ignored. No distinction, for example, is made between forms of market organization—illustrated by the

[1] By assuming that freedom is a natural state rather than a human institution it has been easy for economists to delude themselves into thinking that they are grounding their systems of thought upon natural conditions rather than particular social institutions.

stock exchange or the wheat market—which tend to reduce the effects of disparities in bargaining power or in market information and those types—illustrated by the labor market—which accentuate the importance of these inequalities. The significance of buying and selling policies ordinarily receives no attention in value theory; the determination of retail prices is not regarded as worth distinguishing from the determination of wholesale prices; the influence of custom as a determinant of value, how, when, and to what extent it exerts an effect, has received next to no study. Interest theories are constructed without reference to the credit system, to corporate or to governmental saving. The influence of changes in the price level upon the supply of investment funds and the demand for them—a subject with many intricate ramifications and of much importance—is habitually ignored. So also is the fact that science, by rendering industrial equipment more quickly obsolete and often requiring replacement with larger, more elaborate, and expensive machines, forces saving at a more rapid rate than would otherwise be necessary. When technique is developing rapidly, business enterprises, to maintain solvency, must adopt the newest methods even though dividends must be foregone to do so. Rapid growth of population, characteristic of many American cities, produces results similar to rapid technical change, for, by rendering existing equipment inadequate and obsolete, it in effect destroys capital which has not otherwise outlived its usefulness. Repayment of loans as a method of adding to the capital supply and the extent to which repayment involves additions to capital receive no attention in most interest theories. In the case of unincorporated enterprises where it is not customary to meet maturing obligations through flotation of refunding issues, repayment of loans may represent a net addition to social capital. Wage theories are constructed without inquiry into the extent to which wages determine productivity as well as the extent to which productivity determines wages. The supply of labor and the factors affecting it are studied in only the most general way and with little resort to statistical analysis. The facts that a rise in the standard of living may either increase or decrease the labor supply depending on whether it operates to a greater extent upon the death or upon the birth rate and that a decline in the latter may be the cause of an even greater decrease in the former are customarily ignored. Equally disregarded are the facts that the efficiency of labor depends in large degree upon the method by which its value is determined and that, because it sometimes gives labor a lower productivity than it would otherwise possess, the com-

petitive exchange method of fixing wages may not be the best one. The trade union and the employer's association are not regarded as worthy of substantial recognition in most wage theories.

Not only has economic theory evinced an extraordinary disinclination to take account of the facts of industrial life, but it has also exhibited a remarkable tendency to concentrate attention upon a single problem, regarding it as the central one in economics, and feeling no necessity for extending its inquiries beyond the limits thus set. The question which has acquired this position of peculiar importance is the so-called value problem. By this is meant the problem of how value is determined. Strangely enough, although theorists have regarded value as their chief, if not their exclusive concern, they have not felt that the question of how value functions as an organizer and stimulator of production or as a regulator of consumption is a part of the value problem.

Another outstanding characteristic which economic theory has acquired since Adam Smith is an absence of concern with economic policies and an unwillingness to pass judgment on them. The eighteenth century theorists, of course, were vitally concerned with policies and did not hesitate to use their theories in arriving at conclusions on economic questions. Or perhaps it is more accurate to say that their doctrines were in large degree expressly constructed to justify conclusions already reached with reference to problems of the day. During the last century, however, the belief has steadily gained ground that economics can be a science only by refraining carefully from appraisal.

To these three characteristics of economic theory—its pronounced disinclination to take account of facts, its preoccupation with the problem of value determination, and its aversion to appraisals—is to be attributed the failure of theorists to perceive the supreme importance to-day of the problem which formed the center of interest to Adam Smith, the problem of the organization and the control of economic activity. Absorbed in the study of value determination under hypothetical conditions, paying little attention to technical and institutional development, and not interested in appraising the existing economic system, theorists have seen no reason for inquiring into the question of whether or not free capitalistic enterprise is a satisfactory method of organizing and controlling industry in the days of machinery, science, the corporation, the employers' association, the trade union, commercial and investment bankers, and a highly developed credit system. Despite the drastic revision which they have felt to be necessary in most doctrines of the Physiocrats

and Adam Smith and despite the radical industrial changes of the last century and a half, theorists have felt no need for a fundamental and searching analysis of the extent to which the assumptions of free enterprise are in accord with the conditions of modern industry.

Quite clearly, however, the problem of how value works is quite as much a part of the value problem as is the question of how it is determined. If, therefore, theorists regard value as the central concern of economics, they can scarcely escape investigating how it functions. Equally self evident is the fact that the rapid technical and institutional development of the last century and a half renders it impossible any longer to accept the eighteenth century analysis of the efficacy of free enterprise and makes imperative a thorough re-examination of the problem of organizing and controlling economic activity in the light of modern conditions. Possibly this involves appraisal, but it is a task which the economist can scarcely escape, for, if he does not study how the economic system works, who will? It is the purpose of this paper to make a partial survey of certain aspects of the working of free capitalistic enterprise for the purpose of testing in a general way the degree of correspondence which exists between the conditions of modern industry and those which the successful operation of free enterprise requires. No comprehensive analysis of the working of free enterprise is intended. The discussion will necessarily be brief and incomplete and many topics of first importance will be omitted. It is proposed to touch upon the following principal subjects: The Control of Economic Activity under Free Enterprise; Free Capitalistic Enterprise and Incentives; Free Capitalistic Enterprise and Costs; Economic Conflicts under Free Capitalistic Enterprise.

2. THE CONTROL OF ECONOMIC ACTIVITY UNDER FREE ENTERPRISE

Perhaps the first question which arises when we analyze the operation of free capitalistic enterprise is: If, barring restrictions on fraud and violence, individuals are practically free to seek their self interest in such manner as they see fit, what is to prevent them from doing many socially detrimental things? Why should they, when striving for private gain, unconsciously and unintentionally do the things which promote and refrain from doing the things which injure the public interest?

Although a number of influences, such as public opinion, tradition, and religion, are undoubtedly of great importance, the theory of free enterprise recognizes that in the case of most persons these non-

economic forces need supplementation by material rewards and penalties. But, if the state does not act, how are these to be provided? The theory of free enterprise says: "Through the agency of competition." This is the great regulating force which is assumed to establish effective control over economic activities and to make it to the interest of each person to do what the general welfare requires. Competition among sellers for the custom of buyers is assumed to assure purchasers a fair equivalent for their expenditures. In a like manner, competition among buyers and the freedom of each seller to withdraw from a business or occupation which yields an insufficient return assure the average seller of adequate compensation. Thus competition, according to the theory of free enterprise, is a great protective force, doing what the law under other circumstances would be compelled to do, assuring to buyers honest goods and reasonable prices and to sellers a fair return for their labor and capital.

Since competition is relied upon to make the pursuit of private gain result in the promotion of the public interest, it is evident that the satisfactory functioning of free enterprise depends largely upon how well competition produces this result. But competition does not operate in a uniform manner regardless of circumstances. For it to perform effectively the protective function attributed to it requires, among other things: first, an appreciable interest on the part of buyers or sellers to discriminate against those who disregard the common welfare and in favor of those who observe it; second, possession of sufficient information concerning goods, prices, and the policies of industrial enterprises to make intelligent discrimination possible; third, willingness to take the time and trouble to discriminate; fourth, substantially equal ability to take advantage of alternative opportunities to buy or sell; and finally, absence of too great differences in ability to postpone buying or selling, if terms are not satisfactory.

In what degree are these conditions actually realized in modern economic society? First of all, to what extent do investors, workers, or consumers have an individual incentive to discriminate against business enterprises which disregard the general welfare? Not infrequently such an inducement is lacking. The operation of the old national banking system furnishes an illustration. The public interest required that after a certain point in the period of prosperity the expansion of loans be checked. According to the theory of free enterprise, the banks would be induced to do this through fear of finding themselves discriminated against by depositors, borrowers, investors, or seekers of employment. Actually nothing of this sort

happened. As long as the banks did not imperil their individual solvency, none of these groups had any reason to discriminate against those institutions which ignored the need for credit restriction. Least of all did borrowers, the most important of the four interests from the standpoint of the banks. On the contrary, the interests of each borrower led him to demand expansion rather than restriction of loans, and the desire of banks to retain the goodwill of their customers caused them to consent to an even greater extension of credit than doubtless they otherwise would have tolerated. Competition, far from encouraging banks to do the socially desirable thing, positively encouraged them to do precisely the opposite. Because of these facts, we have been forced to abandon the principle of free enterprise in banking to the extent of creating special machinery to impose on the banks the credit policy which the public interest demands.

The exploitation of natural resources furnishes another instance of competition's breaking down as an agency of social control because buyers and sellers have no incentive to discriminate against enterprises which disregard the general welfare. Purchasers of natural products buy from the producers who sell for least rather than from those who develop resources with the least waste, wage earners sell their services and capitalists invest their funds where they can get the best returns. In so far as uneconomical utilization of natural resources enables enterprises to sell for less or to pay more for labor and capital, it is not only unchecked but positively encouraged by the force of competition. The oil, natural gas, and lumber industries illustrate the point.

The selection of employees is another activity which free enterprise fails to control adequately because no penalty is imposed upon firms which disregard the public welfare in deciding whom to hire. To some extent, of course, workers have an interest—although they may not realize it or have the power to enforce it—in refusing to work for enterprises which violate the common welfare in selecting employees. Thus women and children have an interest in not working for concerns which employ them at jobs which injure them. In some cases, however, it may be harmful to the community for employers to prefer a certain class of workers but to the advantage of the men concerned to accept the jobs. The great influx of immigration, which has been stimulated in no small degree by the preference of enterprises for cheap foreign labor, has been, for several decades at least, probably more detrimental than beneficial to the nation. But regardless of whatever harm may come from the too rapid introduction of aliens, it is to the profit of employers to hire them if they

will do the same work for less and to the advantage of the immigrants to come if the pay is sufficiently more than they could get at home. Nor does it pay individual consumers, investors, or native wage earners to discriminate against enterprises which employ immigrants, if these firms are able to sell for less or to pay investors or native wage earners more.

Still another field within which competition fails to perform the protective function ascribed to it, because individual interests and social interests do not coincide, is that of want creation. Consumers in whom a socially detrimental want has been aroused are not likely to discriminate against enterprises which foster that desire. On the contrary, those are precisely the firms from which such buyers are most likely to purchase. Other consumers find it to their advantage to buy where terms are most favorable, and investors and wage earners to place their capital or to sell their labor where the best conditions are offered, irrespective of the effect of the enterprise upon desires. All this, of course, means that the want creating and modifying activities of modern business go on, subject only to the feeble control of public opinion. Industry, instead of being man's servant, supplying his wants and helping him develop and control his desires in his own interest, seeks to mold them for its own pecuniary advantage. Nowhere does the domination of men by their institutions appear more conspicuously than here where we see an impressive array of specialists—advertising copy writers, press agents, artists, psychologists, salesmen, window dressers, and others—making it their life work to shape men's desires in the interest not of mankind but of business.

No doubt a large part of the advertising and selling activity of business is devoted to arousing socially desirable wants. In so far as this is so, however, it is the result of the happy accident that there is profit in encouraging men to demand things which are good as well as those which are bad for them. In considerable degree the anti-social element in the efforts of business to control demand arises not because the desires—or the fears—stimulated, taken individually and by themselves, are necessarily and inherently vicious. The criticism of the influence of business on demand is grounded on such facts as: that some desires are developed to such an intense degree that they become injurious; that business tends to overdevelop certain wants at the expense of others; that the skill of business in the art of influencing men's minds and its tremendous financial resources are thrown on the side of a scheme of values, a philosophy of what is worth while, which conflicts seriously with the teaching of the

best thinkers of all ages; that undue control is acquired over the manner in which we spend our money, compelling many of us to use it not to gain pleasure but to avoid discomfort; and, finally, that the want influencing activities of business in large measure simply nullify or cancel its productive work by making goods less instead of more useful.

Each of these points can be briefly illustrated. The liquor industry furnishes an instance of want stimulation which was injurious because the desire encouraged became vicious when too strong. Since there seemed no way to prevent business from intensifying the demand for intoxicants regardless of social consequences, the industry has been suppressed.

Since advertising space costs the same whether the response aroused is large or small and since salesmen's salaries and expenses are approximately the same whether many or few orders are taken, it is most profitable to stimulate those desires which are already strongest and most universal, which are most readily aroused and least of all need stimulation. People are more interested in adorning their bodies than in improving their minds, in acquiring social position than in rendering social service, in obtaining physical comfort than in improving their artistic tastes or their morals. Consequently, although business makes articles which serve all of these ends, its expenditures on advertising and selling are devoted far more to pushing things which serve principally the former rather than the latter class of purposes.[1]

Any one-sided development of the interests of a large number of men is likely to have unfortunate consequences regardless of the character of the wants which are overstimulated. Particularly pernicious, however, are the results likely to be when the desires which

[1] The Philadelphia Federal Reserve Bank in its bulletin, *The Business Review* for October 1921, published figures collected by the Curtis Publishing Company on the amounts spent during 1920 in advertising twenty-five classes of merchandise in thirty-six leading magazines. The types of merchandise and the approximate amounts spent on each were as follows: food, $14,400,000; toilet articles, $9,100,000; electrical goods, $8,400,000; household goods, $8,000,000; automobile supplies, $7,800,000; automobiles (passenger) $7,500,000; structural materials, $6,200,000; tires, $5,000,000; musical instruments, $4,500,000; office equipment, $2,950,000; soaps, $2,800,000; shoes, $2,700,000; paints, $2,500,000; machinery and belting, $2,300,000; trucks, $2,250,000; jewelry, $2,200,000; hosiery and underwear, $2,100,000; furniture, $1,950,000; men's clothing, $1,750,000; women's clothing, $1,600,000; beverages, $1,400,000; agricultural supplies, $1,250,000; candy, $1,200,000; paper and stationery, $1,200,000; tractors, $1,200,000.

are overdeveloped are precisely those which everyone agrees are of a lower order even if not positively vicious. However harmless the individual wants may be, a scale of values is built up in which comparatively inconsequential things occupy places of far greater importance than they deserve. Modern business, which spends such huge sums and employs so many experts in persuading men to attach far more weight than they otherwise would to furs, hats, gloves, shoes, collars, jewelry, automobiles, gowns, pretentious dwellings, foods, confections, drink, and does comparatively little to stimulate intellectual, aesthetic or moral interests, can scarcely escape responsibility for building up for purposes of profit a scale of values which no one can defend. To facilitate the sale of goods, it does what it can to persuade men to accept pecuniary standards of success, to attach more and more importance to material prosperity and social position and the things which evidence them, to get satisfaction out of invidious distinctions. The precise things which philosophers and moralists of all ages have urged men to regard as of little consequence business presses on them as of great importance. It employs its numerous experts, its great skill in the art of persuasion, and its tremendous resources to undo in many respects the work of educational and religious institutions and to urge on men a philosophy of what is worth while which education and religion have always taught to be pernicious.

Not only does business influence men's expenditures by molding their desires but it affects their purchases *even despite their desires and often in direct violation of them.* The work of many marketing specialists—particularly those pushing display goods—may be likened to the maintenance by a farmer of a carefully watered mud hole in the road passing his farm that he may collect from passing motorists for hauling them out of it. Marketing experts do not merely create desires which can be satisfied only by the goods which they are pushing but they also create pains which can be avoided only by purchasing the goods. As rapidly as they can, they persuade those consumers who compete most strenuously to adopt new styles. As the new fashions are established other buyers, who would prefer to consume at a slower rate, feel compelled to discard goods of the previous style and to purchase the new. Their motive is less to gain pleasure than to avoid the discomfort of being out of fashion. It is not, of course, asserted that the competitive consumption which forces this reluctant and unwilling buying is solely the creation of business, for it is found among primitive peoples. Nevertheless business both greatly quickens the rapidity with which style changes occur and increases materially the sums spent for display. It would be interesting and impor-

tant to know just in how far the demand for display goods is determined not by desire for the articles but by the competitive pace which marketing experts are ever endeavoring to accelerate and over which, as the arts of salesmanship and advertising are perfected, they are steadily acquiring more and more control.

Finally, the want influencing activities of business nullify in considerable degree its productive activities. The production departments are engaged in the creation of utilities. The advertising and selling departments are often largely occupied in limiting or destroying the want satisfying power of goods. An effort to reduce the utility of an article for the purpose of increasing sales is being made at present by the American Association of Wholesale Opticians. The decision to make the attempt was reached at the meeting of the Association in Rochester during November, 1921. Under the headline, "Set Styles in Eye Glasses, Wholesale Opticians ban Shell-rims for Evening or Street Wear," the New York *Times* of November 16, 1921, reports the action as follows:

"Rochester, N. Y., Nov. 15—The American Association of Wholesale Opticians at its semi-annual meeting here today authorized the appointment of a committee to urge on the public the wearing of eye glasses suitable for the occasion on which they were worn. It was the sense of the convention that shell-rims were not proper for evening or street wear and it is proposed to carry on a campaign to impress this view on the public. Shell-rims were said to be going out of style. They are said to disfigure the face."

Immediately following this action, began a series of advertisements in leading magazines seeking to persuade the public to wear different types of glasses for different occasions—one type with evening dress, another for business, another for out-of-door sports—and endeavoring, of course, to create the conventional belief that other styles would be out of place. In short, the optical dealers are expending large sums of money to limit the utility of their product in order that every one may feel the need of three or four styles of eye glasses instead of one.[1]

But the influence of marketing organizations is not confined to limiting the utility of articles. They endeavor even to destroy as completely as possible the power of goods to give satisfaction. As rapidly as the goods are produced and sold, marketing experts endeavor to render them obsolete and out of vogue by popularizing new

[1] A retail optician informs the writer that another reason behind the campaign is probably the hostility of the trade to shell-rims because of the fact that by reducing breakage they lessen the amount of repair work to be done.

styles. To shorten the life of articles, to prevent buyers from wearing out the things which they purchase, and to force them to discard goods as soon as possible is the aim of many marketing organizations.

Over all of these want influencing activities of business, competition exercises little control. Through its agency no penalty is visited upon those enterprises which are most successful in making men desire injurious things, in causing them to attach great value to articles of little consequence, in inducing them to accept the dollar as the true test of success and the possession of expensive goods as the best evidence of it, or in rendering existing goods obsolete by the creation of new fads and styles. Instead of a penalty there is a reward in the form of greater sales for the enterprises which succeed best in doing these things. No theory of economic organization can ignore the grave dangers which arise from inadequate control over the want influencing activities of business.

It would be possible to point out many other cases in which competition breaks down as a protective force because not enough consumers, investors, or wage earners have an individual interest in discriminating against firms which disregard the common welfare. That business establishments find it profitable to pollute the air or the streams, to locate their plants regardless of the effect upon the value of adjoining property, to indulge during periods of boom in speculative buying which accentuates the ultimate crisis and depression, to increase the severity of depressions by drastically laying off men, is explained in no small degree by the fact that not enough people have an individual interest in discriminating against enterprises which do these things. It is believed, however, that enough illustrations have been given to indicate quite conclusively that, *even were men fully informed of their own interests and entirely rational in their choices,* the value of competition as a protective agency would be extremely limited.

The satisfactory operation of free enterprise requires not merely that a substantial part of the community have an interest in discriminating in business dealings against those who disregard the general welfare but that the information needed be obtainable at little expenditure of time or money and interpreted with little difficulty. Such, however, is often not the case. Business enterprises, it is true, can afford to investigate goods, prices, the existing and prospective condition of the market, and the credit of buyers, and to gather other information necessary to wise choices. They can buy and sell through specialists, purchase on sample or in accordance with

specifications, make tests and analyses, experiment with different products and brands, and determine their choices by the results. But there is much information of vital importance in buying and selling which even they are unable to gather. Some of it they can purchase from market reporting agencies, but to a not inappreciable extent they must act without it.[1] The technique for determining the competency of applicants for employment, for example, is so imperfectly developed that employers find themselves very much in the dark in purchasing labor. This has far reaching consequences, for, since wage earners realize that in the hiring of men competency can be taken into account only in a very crude fashion, the incentive which they have to develop skill is very substantially diminished.

When we turn to wage earners and consumers, we find a far more serious absence of requisite market information. The theory of free enterprise assumes that by shunning those occupations and plants in which wages are relatively low, the strain of the work excessive, or the risk of injury, disease or unemployment exceptionally great, laborers will prevent employers from depressing wages too far or from exacting an unreasonable output and will stimulate them to pay high wages, reduce the physical and nervous strain, and prevent unemployment, industrial accidents, and occupational disease. This presupposes that workmen can accurately compare different occupations and different plants. Much of the needed information is not available in any form and little of it is in such shape that workmen can easily use it. Data on wages and hours are perhaps the most abundant. National and state governments and a few private organizations collect statistics on these subjects, but many occupations and industries are not covered and the information is not reduced to form which the ordinary workman can understand. Rarely are the figures from different industries or occupations brought together and compared. Most important of all, these reports invariably omit comparisons between individual plants. Not even the names of the enterprises supplying information are mentioned. Figures from individual plants are, of course, most essential, for, if competition is to perform the protective function attributed to it, wage earners must be able to choose accurately between employers as well as between industries and occupations.

[1] The business cycle is a standing illustration of how inadequate is the information upon which much buying and selling are done even by business enterprises. It is, of course, true that much poorly timed buying or selling is due to the fact that business men ignore the data which exist rather than to the fact that information is not available.

Information concerning the physical and nervous strain of the work in different occupations, and in different plants is almost totally lacking. This, of course, means that workmen cannot, in any accurate manner, take account of depreciation. One trade may ordinarily wear men out at about forty-five or fifty, another at about sixty or sixty-five, but unless workers know this definitely they cannot choose intelligently between them. Some employments, of course, such as glass-blowing and certain jobs in rolling mills, notoriously wear men out at early ages, but in choosing between most trades the workers must leave the depreciation rate out of account altogether. Even less are wage earners able to know in which plants the human depreciation rate is high and in which ones low. There are enormous differences in the strain put on workers in different establishments, but so many are the factors—speed of work, hours, amount of overtime and holiday work, opportunities to rest, presence or absence of helpers, use of fatigue saving devices, ventilation, temperature, light, noise—which affect the human depreciation rate that to compare even the same occupation in different plants is difficult in the extreme. The comparison of different occupations is, of course, still more difficult. It would be serious enough if business men, in choosing between different employments of their capital, could take little or no account of the depreciation rate. How much more serious is it when workmen cannot take account of the rapidity with which the managerial policies and the working conditions of different enterprises wear out employees.

Until the passage of workmen's compensation acts, little was known concerning the accident hazards of industry. The most obvious risks of different employments, the danger from gears, belts, pulleys, and other moving parts in metal and wood working shops, from burns in molding, from falls in building construction, were, of course, known, but this knowledge could exert little influence because it was not in precise quantitative form. Workers need to know how specific jobs in steel making compare in hazard with various jobs in lumbering or coal mining, how the different operations in a shoe factory compare with particular tasks in a textile mill or a furniture factory, how the risks of railroad brakemen compare with those of linemen on high tension transmission lines. In the absence of definite quantitative information, only the conspicuous, dramatic dangers which make a vivid popular impression, such as the risk of explosion in coal mining or in the manufacture of explosives and of falls in erecting structural steel, greatly influence men's choice of occupations. Other hazards, less impressive but more important, are disregarded. In

coal mining, for example, far more serious as causes of injury and death than catastrophic explosions are cave-ins and rock falls, but the former is the risk popularly associated with the industry. No one thinks of working in a junk yard as particularly dangerous, but the likelihood that the cuts frequently received in handling jagged material will be infected renders this among the most hazardous of occupations. The figures collected in administering compensation acts have revealed that many occupations previously not regarded as particularly dangerous are highly so.

Workmen's compensation laws have resulted in the collection of voluminous statistics on industrial accidents, but these do not appear to have materially enhanced the effectiveness of competition as a preventitive of hazardous conditions. In the first place, little or no effort has been made to bring the available data to the attention of workmen. In the second place, the information has not been reduced to a simplified, understandable form so that workers can easily compare the risks of different employments. In the third place, the figures relate in large degree to *industries* rather than to specific occupations or jobs. Finally, and most important of all, the existing data do not show the relative hazards in individual plants. Unless workmen can discriminate in favor of the safe as against the unsafe plants, they can put little pressure upon employers to prevent accidents.

With respect to the risk of industrial disease and unemployment, data are as scanty as was information concerning industrial accidents before the passage of compensation legislation. No matter how desirous wage earners may be of taking these hazards into account, they can do so only in the crudest fashion. Even the experts have only the most uncertain notions concerning uemployment and industrial disease rates in different industries and occupations, and as to the rates in individual plants, nothing is known. Here are two dangers of the very first magnitude against which competition is practically powerless to protect workmen, for the simple reason that, even if they so desire, they cannot show preference for those employments and enterprises in which the dangers are least.[1]

[1] It is not, of course, intended to imply that workmen make little or no effort to discriminate in choosing employers and occupations. Notwithstanding the tremendous difficulties in the way, they do manage to discriminate to some extent. Labor turnover is a standing manifestation of this fact. Indeed, it is evidence both that workers do discriminate and that they have great difficulty in doing so. Information concerning jobs being so scanty and so difficult to obtain, and waiting without employment for exactly the right job to turn up being so expensive, the worker is also inclined to take what appears

The consumer is little or no better off than the wage earner with respect to the information needed for wise choices in the market.[1] The independent and impartial market reporting services confine themselves principally to the markets in which business man deals with business man rather than with consumer. Professional shoppers exist but are of limited usefulness. As for the consumer's collecting information himself concerning quality and prices, he—or more often she—has so many things to purchase and so little time in which to buy them, that this is impracticable. Often the appraisal of quality requires technical training and knowledge and, not in-

to be the best of the jobs available, trusting to luck that it will prove satisfactory. Once on the job, he discovers how much he can earn at it, how onerous the work is, how fair the treatment by the foreman. Often enough the job proves unsatisfactory, for experience shows that nearly two-thirds of the men newly hired leave within a year the jobs they accept. (Slichter, *The Turnover of Factory Labor*, 44–57.) During periods of boom there is invariably a rapid rise in the resignation rate—it is usually from two to six times greater in these periods than in periods of depression—not only because newly hired men are freer about laving jobs which they dislike but also because some old employees have been only awaiting a favorable turn in the labor market to leave places which they find unsatisfactory.

But even this method of exercising discrimination when on the job is of distinctly limited value. Since workers lack information on so many points, such as the hazards of unemployment, accidents, and industrial disease, and the effect of particular work and working conditions upon the length of working life, they cannot take accurate account of these in deciding whether or not to leave a job and search for another. Furthermore, in order that labor turnover may produce substantial improvements in working conditions, it is necessary that employers be aware both of the extent to which men are resigning and of the cost of replacing them. Until the last decade, however, they were almost completely ignorant of each of these facts. During the war period, many business men first acquired more or less general information concerning the size and cost of turnover, and, as a result, promptly took steps to improve conditions in their plants. Then for the first time, labor turnover began to function effectively as a protective force. Even today, however, thousands of employers are so lacking definite information concerning labor turnover among their men that they do nothing to prevent it. The committee of the Federated American Engineering Societies which investigated waste in industry found that, among the plants studied, only a few had effective employment methods, fewer recorded and analyzed the reasons why men quit, and in most of them no steps were taken to correct the causes of separations. (*Waste in Industry*, 14.) It is one of the great ironies of modern industrial life that the very method of discrimination which the workmen can most easily practice should prove seriously ineffective because of the failure of managers to realize that the men are employing it on an extensive scale.

[1] For an excellent analysis of the consumer's position see W. C. Mitchell's well known article, "The Backward Art of Spending Money," *Amer. Econ. Rev.*, ii, 269–281.

frequently, the making of tests which, of course, are usually out of question.

All of this means, of course, that competition exercises very imperfect control over both prices and quality. There is a tendency, when buyers do not discriminate between the charges of competing sellers, for prices to be set at the point where a monopoly would set them. Realizing that discrepancies in the quotations of competing sellers will be noticed by but a few buyers, merchants have no reason to put their prices as near cost as a fair profit will permit. Some dealers allow themselves larger margins than others. This leads to differences in charges. When merchants discover these differences, the result is not necessarily that those with the high quotations lower their prices. Realizing that most customers will probably not discover the differences, the dealers with the high prices are likely to keep them up. Those with lower prices, aware that they will get little credit from most buyers for charging less and that they may even be injured in the eyes of some—since lower prices may be interpreted as a sign of poorer quality—are quite likely to raise their quotations. Instead of the merchant with high prices saying, "If so and so can afford to sell this article for so much, I can too," the tendency is for the dealer with low prices to think, "If so and so is able to get so much for this article, I can get that much too." *In other words, when consumers do not discriminate carefully with respect to prices, uniformity of price in a competitive market is likely to be established by the low firms' coming up to the high ones rather than the high firms' coming down to the low ones.*[1]

[1] Recently the writer had occasion over a period of a number of months to purchase bottles of a definite size. At one store the price was two for a quarter, at another ten cents apiece, and at a third three for a quarter. Being so imprudent as to tell the dealer who was giving three for a quarter that other stores were asking more, he was not surprised to find on returning the next time that the price had risen to ten cents each.

The ignorance among consumers of charges in different stores furnishes the basis of a number of clever selling policies by which buyers are misled. Perhaps the most familiar of these is that of the cut price leader. A standard priced article is offered for less and the fact featured in newspaper advertising and window displays. The public, inferring from the cut on the leader that the store is generally below the market, flocks to buy, but on many articles pays not only the prevailing price but something more besides.

It is not, of course, denied that there are numerous exceptions to this tendency for uniformity in price to be established by low firms' raising their quotations instead of high firms' lowering theirs. Some stores practice consistently a low price policy, even though by so doing they sometimes unjustifiably acquire the reputation of offering inferior quality. Other dealers sell

The limited ability of consumers to distinguish quality forces them in large degree to judge it by price. Dealers are well aware of this and profit by it, by placing higher prices upon part of their stock. Frequently there is no essential difference between the more and the less expensive goods.[1]

It will be urged that even though consumers cannot judge quality by inspection, they can often discover it by experience. This objection contains much truth. Clothing manufacturers, for example, are able to sell inferior garments made by inexperienced strike breakers but discover that their sales suffer in the following year as a result of complaints which dealers have received from dissatisfied customers. At the best, however, experience is a slow and costly way of discovering which goods are superior. Frequently it does not lead to the consumer's discovering which goods are really best, for, if he is reasonably well satisfied with a certain brand, he is likely to continue to use it rather than to experiment with others. So long as many people do not make careful comparisons, there is a considerable market for inferior goods, provided only that they are not too inferior. Finally, the consumer's judgment of quality is determined largely by that to which he has been accustomed. Were he able to realize how much better service is possible, he would undoubtedly demand the superior article. As it is, discrimination among buyers places upon producers comparatively light pressure to improve the quality of their goods.

It is not enough, however, that buyers and sellers have the information needed to enable them to discriminate. It is also necessary that they be not too careless or indifferent to use it or prevented from doing so by clever salesmen or purchasing agents. Even business men are far from being the carefully calculating, unemotional, intellectual machines which the theory of free enterprise assumes them to be. Often they are too busy, too careless, or too lazy to investigate thoroughly the alternatives presented to them, and they are far

at a fixed percentage over cost regardless of whether the resulting prices are above or below those of competitors. These exceptions, however, do not destroy the essential truth of the contention that when buyers do not discriminate carefully the tendency is for prices to be set as a monopoly would set them, at the point of the largest net profit rather than at cost plus a reasonable profit.

[1] Knowledge that consumers judge quality by price is one reason why manufacturers of standard priced goods object so strenuously to retailers' offering the articles at cut prices.

from being unsusceptible to the talk of clever salesmen, who sell less by appealing to the judgment than by disarming it.[1] Far more than business men are wage earners and consumers inclined to be careless and indifferent to their interests in business dealings. Most of them are amateurs when it comes to buying and selling. They have not been trained to suppress their whims and fancies, their optimism and their credulity, and to be matter of fact, skeptical and not too easily convinced by clever talk or carefully planned selling demonstrations. Most persons, for example, have a predisposition to be optimistic. They tend to assume that goods concerning which they know little will prove satisfactory. Particularly important is the effect of this optimistic tendency upon the wage bargain. The hazards of industry seem so remote and unreal that, however much workmen may fear them under certain conditions, when it comes to choosing between a higher paying job at which the risks are great and a lower paying one at which they are small, most workers accept the greater risk for an insufficient differential. Each has faith in his luck and thinks of unemployment, industrial accident, and industrial disease as things which may happen to others but which he will escape.

As long as business enterprises were less skillful in buying and selling than they are now, the tendency of consumers and wage earners to be careless and influenced greatly by impulse, whim, and prejudice in buying articles of consumption or in selling labor did not greatly matter. As business houses have perfected their buying and selling practice, as they have made use of science and employed

[1] The experience of many states with competitive employers' liability funds offers striking evidence of these facts. Although these funds usually furnish insurance for less than do private underwriters, they obtain but a small part of the business. In New York, where the state fund rates are about twenty-seven and a half per cent below those of private insurers, only $3,000,000 of the $43,000,000 paid annually by the employers of the state for liability insurance goes to the state fund. (*American Labor Legislation Review*, xiii, 79.) The failure of business men to buy insurance where it is cheapest is due no doubt in part to prejudice against the state's engaging in any form of business. It is probably due also in some measure to the assistance in the prevention of accidents which private insurers give but which the state funds do not, although this can scarcely be a primary consideration. The explanation must be sought principally (1) in the indifference and carelessness of business men in purchasing and (2) in the effectiveness of aggressive and skillful salesmanship, even when the customers are business men. The private insurers have systematically endeavored to undermine confidence in the solvency of the New York State Fund and, despite the fact that their allegations have been proved erroneous, many employers have been misled.

expert specialists, consumers and wage earners have suffered more and more from their own carlessness and lack of discretion. Business is to-day well prepared to take advantage of every failure on their part to guard their interests. Elaborate sales departments, manned by highly paid experts, closely analyze the market for the purpose of discovering what classes of people are the best prospects and what selling methods are likely to prove most effective. Prospective buyers are minutely studied and classified. Every desire, hope, fear, whim, prejudice, or impulse which might possibly lead people to buy is sought out, and methods of appealing to it are developed. Possible objections are foreseen and answers to each are carefully contrived. Selling methods and advertising appeals are tested out, and on the basis of the results, existing marketing practice is perfected. An effort is made to develop selling and advertising methods to suit the psychology of every important type of customer. Many large stores and manufacturers maintain schools in which their sales people are instructed in the art of influencing the buyer.

Specialized employment departments are a later development than marketing departments, and their technique is less advanced. Their practices are materially affected by whether they are operated in conjunction with a liberal or a drive labor policy. If the employer desires, the department may be used to reduce in substantial measure the effectiveness of competition for labor as a regulator of wages and working conditions. It is the business of the department to make possible the maintenance of the wage scale and the conditions of work which the employer chooses, whatever they may be, by finding men who will accept them. The more skill employment experts develop in the art of discovering, attracting, and holding workers who are willing to endure long hours, extremely heavy work, or extraordinarily great risks for little or no extra compensation, the less necessary it becomes to offer adequate compensation to induce men to put up with these conditions. Competition for labor comes to be based less purely on wages and working conditions and more upon skill in obtaining and holding the most docile, most easily satisfied, and least discriminating workers.[1]

How the operation of competition as a protective agency is af-

[1] Under many circumstances, however, progress in employment technique causes a liberal labor policy to be profitable where otherwise it might not be. Good working conditions, a wage scale above the market, and a liberal attitude on the part of the management are advantageous when it is possible to build up by these methods a really superior force. Such conditions, however, at-

fected by the relative ability of buyers and sellers to wait or to take advantage of alternative opportunities to buy or sell scarcely requires discussion. For competition to protect both parties equally, each must have substantially the same ability to deal elsewhere or to wait. This is clearly illustrated by the influence of the different phases of the business cycle upon the operation of competition and by the failure of competition under many circumstances to give adequate protection to labor.

In addition to those which have been discussed, there are other factors which affect the efficacy of competition as an agency of social control, but it is impossible in this brief paper to analyze them. Before the discussion of this topic is concluded, attention should be directed to the fact that within particular fields of economic activity numerous peculiar conditions greatly influence the functioning of competition. These special circumstances are often of the greatest significance and no realistic analysis can ignore them. In order to illustrate how important they sometimes are, let us analyze some of the peculiar factors, affecting the operation of competition in the determination of wages.

Orthodox theory asserts that competition among employers for labor will cause wages to approximate labor's marginal productivity. The orthodox doctrine, it is true, does not declare that this tendency will be fully realized in practice. The probability, or even the certainty, of impeding factors is admitted, but no detailed analysis is made of precisely what the disturbing factors are or of how serious is the discrepancy between wages and marginal productivity.[1]

tract all manner of men. The better able the employment department is to pick from the numerous applicants those who are really superior, the more it pays to offer special inducements to attract such men. The rapid development in employment technique is quite likely to make more distinct than ever the cleavage between the plants which endeavor to attract the better men by a liberal policy and those which pursue a drive policy and attempt to recruit the less discriminating workmen.

In noting how business enterprises profit from failure on the part of workmen to discriminate, attention should be called to the fact that the sweat shop is primarily a device for getting the least discriminating or most necessitous type of labor at the lowest possible wage. The sweat shop owner is scarcely more than a workman himself. He lives in the working class district, speaks one or more of the languages of the workers, and has relatives and friends among them. His contacts enable him to handpick a force of the most docile, least informed, and most necessitous workers available. Because of this he finds it unnecessary to pay as much as larger enterprises, less intimately in touch with the supply, are compelled to give.

1 No implication is intended that marginal productivity is the test of fair

As a result of technical progress, improved managerial organization and methods, more widespread and better education of both wage earners and executives, and increase in the supply of capital relative to population, the marginal productivity of labor has for many generations been rising. In addition, the price level has shown a general tendency to mount. Both of these changes require that money wages rise if real wages are to bear the same relation to labor's marginal output.[1] How promptly and effectively a rise in labor's productivity forces up wages depends upon how completely the de-

wages. Although it is difficult to see why labor should receive less than its marginal productivity, it is by no means clear that it should never receive more. This, of course, would mean that some other factor would receive less than its marginal product, but, in the case of natural resources at least, there seems no reason why this would be unfair. To illustrate the point, assume that successive increments of labor yield additions to the product of 1000, 800, 700, 600, 500, and 400. If the ratio of labor to land and capital were 4 to 1, the total product would be 3100, the marginal productivity of labor would be 600, each laborer—according to the orthodox theory of competition—would be paid an amount approaching 600 as a limit, and the entire force would receive a total of about 2400. Were the ratio of labor to land and capital 5 to 1, the respective amounts would be 3600, 500, 500, and 2500, and were the ratio 6 to 1, the amounts would be 4000, 400, 400, and 2400. If we compare the cases of 5 and 6 laborers, we see that the increase in the labor supply has increased the total product, but decreased the share of labor from 2500 to 2400. As no other change in the conditions of production has occurred, there is nothing to account for greater output except the larger number of laborers employed. Nevertheless, the six laborers receive somewhat less than five formerly did and the same amounts of land and capital receive somewhat more. The entire increase in output for which labor is responsible, as well as some of the product previously attributed to labor, is now imputed to land and capital. Clearly so far as labor (and probably capital also) is concerned, there is little reason to accept marginal productivity as a test of fair compensation.

[1] It is assumed that the increase in general productivity does not result in a decrease in the price level through the quantity of goods in general becoming greater relative to that of gold. It is, of course, possible that the output of industry might increase more rapidly than the stock of gold. In this case it would not be necessary for wage earners to obtain higher money wages in order to share in the general advance in productivity. Actually, however, the growth in the general output of goods has not caused a falling price level except for comparatively brief periods. Advances in methods of mining and refining and the facilitation of gold discoveries by better transportation, combined with improvements in the art of banking and the credit system have been so great relative to the general advance in production that the price level has shown a general tendency to rise. Since the difficulties which stand in the way of the workers' benefiting from the rise in their productivity are primarily those of getting higher money wages, the question of whether or not an increase in the output of industry lowers the price level is obviously of the greatest importance.

mand for labor is determined by its output. The assumption that the demand for labor is substantially identical with its marginal productivity, that if labor's output *enables* employers to pay more, they will be *willing,* if necessary, to do so, is subject to important qualifications. One important determinant of the demand for labor is employers' conceptions of what is fair compensation. Many business men will put up with a more or less serious shortage of workers rather than pay more than they consider labor to be worth. Their conceptions of labor's worth are largely determined, however, by what they have been used to paying. If they have been in the habit of giving a certain class of men forty cents an hour, they acquire the idea that this grade of labor is worth no more. Even when the price level advances it is difficult for many employers to feel that wage earners are entitled to more than the customary rates.

Another reason why employers do not offer more for labor when its marginal productivity rises is the great uncertainty of modern business. Although they may at the moment be able to pay more, they cannot be certain of being able to do so for an indefinite period. Once wages are raised, however, it is difficult to reduce them without arousing much friction and misunderstanding. Knowing this and realizing the difficulty of forecasting the future, employers seize every opportunity to increase the margin of safety between their costs and their incomes. Against more or less permanent increases in their expenses they are particularly anxious to guard. Thus again we find many business men who, rather than commit themselves to a higher wage scale, prefer to struggle along, if necessary, with undermanned plants.

The reluctance of employers to raise wages because of labor's greater productivity is accentuated by the possibility of competing for men in other ways. Laborers are constantly leaving their jobs and the employer with an efficient and aggressive employment department may be able to procure enough workers to man his plant with little or no advance in wages. But the firms with the best organized and most efficient employment departments are likely to be those which are in general the best managed and in the best financial condition. This means that the very establishments which probably can most easily pay more are precisely the ones which are most likely to increase their forces as much as they desire with little or no advance in rates. If the prosperous and best managed enterprises raise wages but little, the smaller and weaker ones are less able and willing than ever to advance their scales.

By far the most important influence affecting the unwillingness of

business enterprises to advance wages when the marginal productivity of labor goes up is the effect of higher wages for newly hired men upon the compensation of the remainder of the force. Assume that increased physical productivity or rising prices enable an enterprise to employ nine hundred men at $4.25 a day instead of, as has been the case, eight hundred at $4.00. Does the fact that the firm can take on a hundred additional men at $4.25 without paying any one of them more than he adds to the product, mean that it will, if necessary, offer $4.25 to obtain a hundred more men? The management must reckon with the fact that, if it does not offer $4.25 for new men, it can probably retain its existing force at $4.00 for some time, but if it gives new men $4.25, it will injure morale, arouse discontent, and cause resignations if it does not raise all of the force to the new rate. Rather than give each one of the eight hundred already employed twenty-five cents more per day, the enterprise is likely to find it more profitable to get such additional men as it can without increasing wages and to retain its old scale for some time even at the cost of a labor shortage. In the case of a few firms, idle producing capacity may be sufficient and indirect costs so important that it would pay them to advance the entire force to $4.25 if they could thereby procure the hundred additional men. Such cases, however, are likely to be exceptional. And even though it might be profitable to raise both the hiring rate and the scale of the entire force for the purpose of attracting additional men, it would not usually pay to advance wages up to labor's marginal product.

In concluding this discussion of the relation of labor's compensation to its output, it is desirable to point out that even were wages equal to marginal productivity when the employment contract was made, the correspondence would not be likely, under most market conditions, to continue long. In every plant a nibbling process is constantly going on by which the management seeks to obtain more work for the same money. Piece rates are cut, the amount of output expected each day is increased, standards of quality are changed. So long as the management does not outrage too much the workers' sense of fairness, it can go a considerable distance in exacting more and better work. A few men may leave because of dissatisfaction with the more severe standards, and under some market conditions a considerable number may do so. Most of the workers, however, will remain. Changing from one position to another is a gamble. The minutely specialized jobs of modern industry are sufficiently different from one another that the worker who has made reasonably good money at one position may find that he lacks a certain knack or

dexterity which another place requires. He knows the good and bad points of his present job. He cannot tell what sort of work, foreman, factory associates, or working conditions he will encounter in another plant. The jobs which are most frequently vacated and which make up the majority of those waiting at any time to be filled are naturally the least desirable ones, those which pay the least and involve the heaviest and most disagreeable work. Hence, it is not surprising to find that most newly hired men remain but a short time at their new positions.[1] Many workers know from experience the difficulties of finding a satisfactory place, and this renders them loath to leave a reasonably good place without strong provocation. Furthermore, if a man has worked in a plant for several years, he probably feels that his service record has given him a certain standing in the eyes of the management, which is therefore more inclined to overlook the mistakes which he now and then makes. Certainly it is likely to take those mistakes less seriously than were he new and untried. His service with the firm also gives him a feeling of some security against lay-off. He believes that he would not be the first to lose his job should slack times arrive, and he feels, furthermore, that, if the management must lay him off, it will keep his job open for him if he wishes it back when business revives. Many members of most forces, it must be remembered, are men of middle age. The reluctance of the average enterprise to hire these men, combined with the fact that they usually have families, renders it unlikely that many of them will give up their jobs because standards have been made more severe. Most reductions in the piece rates or advances in the amount or quality of the work demanded are made during years of depression or in off seasons. Before a brisk demand for labor returns, the workers have become used to the new rates and standards and accept them as normal. But even in boom times, when the labor market is least favorable for it, some firms succeed in speeding up their men. Rising prices render the workers eager to earn more. Enterprises which pay by the piece can enable them to do so by raising the tacitly understood deadline up to which earnings may go without rates' being cut. Thus, despite the rising price level,

1 Figures collected by the writer indicate that from sixty to eighty per cent of the men hired by industrial establishments leave within a year the positions which they accept. (*The Turnover of Factory Labor*, 50.) This is most striking evidence that the jobs which become vacant are exceptionally undesirable ones. That most men do not leave their positions frequently is shown by the fact that in typical plants from fifty to ninety per cent of the forces have been in the service of the employer for two years or more. (*Ibid.*, 49.) This is true of enterprises with turnovers as high as the average.

piece rates remain unchanged. Many firms went through the entire war and post war period of inflation without raising more than a few scattered piece rates, and such advances as were made were usually far less than the rise in the price level.

It is, of course, true that competition sooner or later gives to consumers much of the savings achieved by compelling workers to do more for the same compensation. As workers are also consumers, this means that they receive partial compensation for their greater exertion. The art of limiting competition in price is so highly developed, however, that in many cases much of the saving must never reach the consumer. And even where it does, the process is a slow one and there is a substantial period during which business enterprises retain the entire gain.

3. FREE CAPITALISTIC ENTERPRISE AND INCENTIVES

Whenever, for any of the reasons just described, buyers or sellers fail to discriminate in favor of enterprises pursuing socially desirable policies and against those employing vicious policies, an incentive to do socially desirable things is lacking and there is created a positive inducement to do socially detrimental things. The preceding discussion, therefore, has been an analysis, extremely general in character, of incentives under free capitalistic enterprise. It is proposed here to inquire somewhat more specifically into the problem. The discussion is not intended to be comprehensive and only a few outstanding aspects of the subject will be touched upon. The following are the principal topics which will be discussed: (1) the incentive for business enterprises to restrict production; (2) the failure of free enterprise to eliminate wastes in internal plant management; (3) the absence of incentives for workmen to coöperate in production.

One of the most remarkable features of modern industrial society is the extraordinary uncertainty in the demand for goods which exists despite the very great need for them, the unprecedentedly great ability to buy them, and the extensive efforts made by business to stimulate purchasing. This uncertainty is due to a number of causes. Some of them, such as fluctuations in annual crop yields and the seasonal changes in the weather, are entirely independent of the economic order. Others are wholly or in part products of industrial institutions. The fickleness of consumers' desires—the disposition to purchase on the basis of whim and fancy, suddenly to take up new styles and quickly to drop them again—although attributable in sub-

stantial degree to human nature, is in no small measure a creation of competitive profit seeking. It is one of the anomalies of modern industry that the very efforts of business enterprises to make their position in the market more secure by strengthening the demand for their products should often render the market less certain. To enhance the demand for their output, producers offer the consumer greater variety and encourage him to prefer something new, distinctive, and different.[1] But when the consumer is induced to indulge his fancy and is offered a wide assortment of choices, it is impossible to tell what particular styles will prevail. We know that people will be wearing hats, shoes, and clothes three or four months hence but we do not know what kinds they will be demanding. The business cycle, another important cause of uncertainty in demand, is in no small degree a product of freedom of enterprise. Finally, the fact that our economic system is a competitive one renders the uncertainty in the markets of individual enterprises far greater than in the market as a whole. However sure the total demand for a product may be, the individual firm dare not count on a market for its output, for the volume of its sales depends upon the result of a competitive struggle.

Whether the uncertainty in demand is due to the industrial system or to other causes, the effect is the same. Free competitive enterprise is peculiarly unfitted to function well in the face of uncertain demand, and at the slightest uncertainty it restricts production. The outstanding exception to this rule is agriculture, where costs are either indirect or non-pecuniary and where, in consequence, it pays the individual enterpriser to produce to capacity almost regardless of market prospects.[2] In other branches of industry, however, the effect of uncertainty is to cause curtailment of output. The individual business establishment possesses too slight control over prices and over the designs, styles, and models which are offered to the public to go

[1] The committee of the Federated American Engineering Societies which investigated waste in industry found that in the men's clothing industry "the trend in recent years due to the desire of the manufacturers to stimulate additional demand and their fear of losing ground to competitors, has been toward an increasing number of styles of young men's suits and of varieties of cloth." (*Waste in Industry*, 96.) They also found that the style of shoes is becoming of greater and greater importance. "It has been said, in fact," the committee reports, "that millinery in footwear is outstripping millinery in hats." (*Ibid.*, 139.)

[2] The fact that the farmer goes on producing the same amounts when other branches of industry are curtailing output goes far toward explaining why industrial depression falls on the farmer with particular severity.

very far in producing to stock during a slack season. It cannot be certain that some competitor will not develop a new style or design or make some improvement in the product or the process of manufacture which will render any accumulated stocks of substantially less value. Nor has it any assurance that other firms by producing stock during the dull period may not pile up such large surpluses that the price will be forced below cost or that changes in the general business situation will not bring a severe drop in prices.[1] Under these circumstances, the firm which pursues a conservative policy adjusts its output rather closely to immediate demand and tends to underproduce rather than to overproduce.

Examination of the situation in different industries bears out the conclusion that chronic underproduction is an inherent characteristic of free enterprise. The committee which investigated waste for the Federated American Engineering Societies found, for example, that productive capacity—assuming existing efficiency—exceeded actual output in the men's clothing industry by about forty-five per cent,[2] in the shoe industry by nearly one hundred per cent,[3] and in the printing industry by over fifty per cent.[4] The bituminous coal industry has an annual capacity of 800,000,000 tons but its actual output has never exceeded 579,000,000 tons.[5] Records of blast furnace output show that the iron and steel industry usually has a large unutilized capacity. It is estimated that the Portland cement industry could produce 140,000,000 barrels annually but in the boom year of 1922 its output was only 113,870,000.[6] The automobile industry is equipped to turn out approximately 4,500,000 cars a year. It is believed that the output for 1923 will surpass that of any previous year but even the production for this year is not expected to exceed 4,000,000 cars. In every case the need for the goods and the

[1] The coal industry illustrates clearly how uncertainty in demand and prices limits production in anticipation of demand. In the anthracite branch of the industry, which is strongly monopolized, coal is mined in excess of consumption during the slack season and stored to meet the fall and winter demand. In the bituminous branch, which is highly competitive, this is not done. The essential reason for this contrast is not that bituminous coal is more difficult to store, for where sufficient inducement exists, as at the upper lake ports, it is stored, but that competition in the bituminous industry renders prices so uncertain and so beyond the control of the individual enterprise that operators dare not store it. They are unwilling to produce for an unknown price.

[2] *Waste in Industry*, 17.

[3–4] *Ibid.*, 18.

[5] First preliminary report of the United States Coal Commission, quoted in *The American Labor Legislation Review*, xiii, 50–51.

[6] Letter to writer from the Portland Cement Association.

fundamental ability to pay for them exist. Only the incentive to produce to capacity is lacking, and its absence is due to the fact that our existing form of industrial organization makes demand abnormally variable and uncertain and production in anticipation of orders extremely dangerous.

One of the most extraordinary characteristics of modern industry and one of the most difficult for the student of economic motives to explain is the existence of numerous wastes which are, for the most part, rather readily discernible and which could be eliminated or reduced with considerable profit to business owners. The fact that these losses are permitted to go on, when it would pay enterprises to reduce them, is the most remarkable element in the situation. Mr. F. W. Taylor and his followers have pointed out these wastes in considerable detail, but perhaps the most comprehensive and most reliable general description of them is the report of the Federated American Engineering Societies on *Waste in Industry*. This report presents economic theorists with a problem of first magnitude. How can the existence of wastes so conspicuous and so large be explained? How did they grow up? Why are they permitted to exist? Why was an investigation of outside engineers necessary in order to disclose them? Why has so little been done to reduce them? Are these faults in managerial practice a natural product of the existing organization and control of industry? Is it possible that competition is less effective as a stimulator of efficiency than it has been assumed to be?

It would require a field investigation to explain accurately and with reasonable completeness why business enterprises fail to reduce costs which they profitably could. Here we can only outline the essential features of an explanation. Many answers to the problem occur which are true enough but which, instead of giving a fundamental explanation, require themselves to be accounted for. Thus it might be suggested that most eterprises lack the precise quantitative information—such as accurate figures on costs, labor turnover, spoilage, power plant efficiency, and often even on inventories—which is needed to bring the sources and amounts of waste to the attention of the management.[1] Significant, however, as the absence of

[1] An investigation of printing plants in New York City by the United Typothetæ disclosed 56 plants using the standard cost system prepared by the association, 187 plants with no cost system but a knowledge of all general costs, 741 plants with no cost system and incomplete knowledge of all general costs, and 554 with no cost system and incomplete knowledge of general costs. (*Waste*

such information may be, it is primarily an instance of inefficiency rather than an explanation of it. Equally superficial is the suggestion that managements are too custom bound to be efficient. Did the incentives and the other conditions needed for efficiency exist, adherence to traditional methods at the expense of economy would not occur. Nor is it satisfactory to say that waste and high costs are due to the fact that business executives are burdened with too many and too diversified duties. It is true that subdivision of administrative labor has proceeded none too rapidly, particularly in the production departments of business. Specialization, however, is no new principle, and the essential question is not what wastes result from the lack of it but why the need for more of it has not been seen.

There appear to be three fundamental reasons which account in considerable measure for the extraordinary inefficiencies in internal plant mangement. One is the business cycle. During boom periods, when orders accumulate and greater promptness in filling them is more important than lower costs, business enterprises are unwilling to endure the interruptions to the flow of work and the delay in deliveries which the installation of better methods would involve. In slack periods, when firms are liquidating indebtedness incurred at a much higher price level and when they have not yet recovered from the losses of working capital which falling prices have inflicted upon them, they feel unable to afford the expenditures which many technical and administrative improvements require.

More important than the business cycle as a deterrent to progress in operating methods is the fact that managements lack the benefit of suggestions and criticisms from those who are in the best position to observe points of waste and to suggest changes, namely the workmen and the minor officials. Lacking the active coöperation of these two classes of employees, no management can expect to maintain high standards of efficiency. The ways in which waste may occur are far too numerous for a small group of high officials to discover all of them. The reasons why industrial enterprises fail better to command the coöperation of workmen—and, to a less extent, of minor officials

in Industry, 13.) These figures confirm the investigations on the subject of costs made a few years ago by the Federal Trade Commission. The committee of the Federated American Engineering Societies found that a minority of the contracting firms and the metal working establishments investigated had adequate cost systems (*Ibid.*, 75 and 220), and that a majority of all enterprises studied lacked adequate personnel statistics.

—will be discussed in some detail presently. The fundamental cause is to be found in the organization and control of industry. Managements are responsible to capitalists rather than to workers, and administrative policies are designed to advance the interests of the capitalists, not those of the employees. Clearly in enterprises operated for the profit of the owners rather than of the employees there is little room for suggestions or criticisms of operating methods from the employees. The officials can scarcely encourage workers to criticize policies designed to benefit the investors, often at the expense of the wage earners. Furthermore, were the men to make a practice of suggesting and criticising, they would sooner or later develop an attitude of self assertion and independence which would render them unwilling to submit with docility to the management of industry for the benefit of capitalists. Finally, the workers and lower officials, not sharing in profits, have little or no incentive to offer suggestions. On the contrary, they have a positive interest in not doing so, for technical changes might require knowledge or ability which they do not possess or expose them to the competition of cheaper men.

A third reason for the persistence of serious and conspicuous wastes in industry is the fact that conditions under free enterprise require that heads of concerns give their attention primarily to the problems of general business policy and strategy rather than to those of internal plant management. Modern business, as we have seen, is done under conditions of highly uncertain markets and an ever changing price level. Compared with the past, the margins between prices and costs are small, and each firm is constantly exposed to the attacks of competitors. Due to fluctuations in the volume of sales, both seasonal and cyclical, most establishments are usually in possession of idle productive capacity. Reduction of this unused capacity means extraordinary gains to the enterprise, because many costs do not increase when the plant and force are more completely utilized. Increase in idle capacity, on the other hand, means equally severe losses, for the costs connected with the unused plant and force go on with little diminution. All of these things combine to prevent business heads from concentrating attention upon the problems of operating efficiency and cause them to give first consideration to the study of market trends, the moves of competitors, buying and selling strategy, and the problems of finance. To the production departments of their enterprises they can give only the most general supervision and these departments, in consequence, fail to feel the spur to the achievement

of the highest efficiency which comes from the close and critical scrutiny of operations by the highest executives.[1] Indeed, the situation of the individual business establishment under our competitive régime may be compared to that of a nation engaged in war. Just as the nation must put the immediate winning of the conflict ahead of everything else, including the efficient and economical production of military supplies, so the business enterprise must place the fight for business ahead of considerations of efficiency. Only when the risks of business are materially reduced, when markets are relatively secure, when enterprisers need not worry so much about the moves of competitors, changes in prices or demand, or their ability to keep their employees and machines busy, can we expect the actual making of goods to receive the attention that efficiency and the avoidance of waste require.[2]

One of the most striking aspects of the problem of incentives in modern industry is the failure of business enterprises to procure the active coöperation of workmen in increasing output and in keeping down costs. The theory of free enterprise assumes that this cooperation will be forthcoming because workmen will be re-

[1] Inasmuch as the heads of many concerns have not been selected on the basis of their knowledge of production technique, it is probable that closer attention to production problems by them might not yield any better results. It is nevertheless true that in the long run industrial efficiency would be greatly advanced were it possible for the highest executive, who stands closest to the owners and who more often than his subordinates is an owner himself, to make the supervision of productive operation his chief concern. The qualifications of chief executives would, of course, change as their duties changed.

[2] Nearly any industry will furnish abundant evidence of how the development of manufacturing efficiency is impeded by the absorption of the principal executives in problems of selling. An industry which illustrates this point in a somewhat extreme but exceptionally clear manner is the making of women's cloaks, suits, and dresses. The factories in this industry are small—usually employing less than a hundred workers—so that the possibility of the chief executives' keeping in close touch with production methods and plant conditions is particularly good. Despite this fact, the business heads pay little attention to manufacturing operations. Most of them know almost nothing about factory management and make little effort to adopt such of the more or less generally accepted principles of industrial administration as the conditions of the industry permit. Success in the business depends to such a limited extent upon costs and to such a high degree upon having an attractive and up-to-the-minute line of goods and a competent force to sell it, that the typical business owner in the cloak and suit or dress industry gives his attention almost exclusively to supervising the designing and selling of his line and to the financial problems which, in a highly seasonal and risky business, are exceptionally acute.

warded for it by better pay, steadier work, and more rapid promotion. The theory, however, does not appear to work out in practice. Scarcely any complaint is voiced more universally and emphatically among employers than the one that labor is indifferent to output, does not concern itself with the prosperity of industrial enterprises, and is disinclined to go out of its way to help make them successful. The ingenuity which workers might use in increasing production they devote to concealing how little they are doing. Not by willing coöperation but rather by a struggle, by drive methods, by prodding, pushing, and sometimes by threatening, is output in the typical shop obtained, and then, instead of being as much as the men can give, it is as little as they must give. Frederick W. Taylor, founder of "scientific management," did not seriously exaggerate when he wrote: "Systematic soldiering is done by men with the deliberate object of keeping their employers ignorant of how fast the work can be done. So universal is soldiering for this purpose that hardly a competent workman can be found in a large establishment who does not devote a considerable part of his time to studying just how slow he can work and still convince his employer that he is going at a good pace."[1]

This discrepancy between the theory and the actual state of things constitutes a grave indictment of both the theory and the existing economic order. Few more serious criticisms could be made of modern industry than that it is a system of forced production, unable to elicit labor's hearty coöperation, and able to obtain only such output as it can compel workers to give. An industrial system, which has labor working against it rather than with it, must be inefficient in the extreme, no matter to what degree the art of speeding up may be perfected. For, although men can be compelled to work at a high rate, it is impossible to force their intellectual coöperation. If we regard men's minds as a species of capital, capable of contributing many valuable ideas for the improvement of technical processes, we may describe the existing situation by saying that, so far as wage earners are concerned, this capital is lying idle, contributing practically nothing. Or, more strictly speaking, it is not idle at all but is working to limit rather than to increase production by suggesting to workmen ways and means of keeping down output.

What is the explanation of labor's indifference to production and costs? The problem divides into two parts: the question of why each individual does not turn out on his particular job as much as he can without injury to health or undue fatigue, and the problem of

[1] *The Principles of Scientific Management*, 21.

why each workman does not do what he can to increase the output and to keep down the costs of the enterprise as a whole. Three principal reasons appear to account for the lack of interest among workmen in their individual output. They are: (1) insecurity of employment; (2) the tendency for more output to result in lower rates of pay rather than in higher earnings; (3) the prevalent failure to promote men on the basis of merit.

Little comment is required upon the relation of insecurity of employment to restriction of output. As is well known, even in times of prosperity, many workers are unable to obtain steady work at their occupations. Although in boom times the total number of jobs may be no less than the number of men who are able and willing to work, the seasonal character of most trades and industries renders unemployment a real danger to the workers in them even at the height of prosperity. Bearing in mind the limited number of jobs and the temporary character of many of them, it is apparent that one of the principal problems of the wage earner is how to make the limited amount of work yield the largest possible volume of employment. This he attempts to do by going slowly. By working rapidly he may simply bring closer the time when he no longer will be needed, but if he works slowly enough, he may not lose his place at all, for new orders may come in which will prolong his employment. Restriction of output, then, is simply a way by which workmen seek to introduce security into an economic order which frequently does not provide as many jobs as there are laborers and which throws large numbers out of work every day because it has nothing for them to do.

The theory of free enterprise assumes that workers who do more or better work will be paid more and that this will stimulate them to work harder and to invent short cuts which will enable them to produce more with less effort. In actual practice, however, this theory is not realized. When, by any method, a worker pushes his output above the level of the group or above his previous performance, the effect usually is that his pay remains the same, but that the amount of work which he is expected to do is increased. If payment is by the time, the time rate remains unchanged, but the new output, or something approximating it, soon becomes established as the standard which each worker must thereafter attain or lose his job. If payment is by the piece, the piece rate is usually cut so that the men must work faster in order to earn their old rate of pay. In other words, instead of greater productivity's being rewarded, as the theory of free enterprise assumes it will be, it is penalized.[1]

[1] The theory of free enterprise presupposes a certain amount of friction.

Why is it that, despite competition for labor, employers can exact more work for the same compensation? The problem has two aspects. In the first place, there is the case of the exceptionally skillful or ingenious workers who are able to increase their output because of superior skill or by devising short cuts or better methods of work. Why does not competition push the wage for men of this type above the general level? In the second place, there is the case of the workers who raise their production not by skill or more ingenious methods, but by greater physical and nervous exertion. If the employer insists that they maintain the new speed for the old compensation, why do they not shift to other plants where the work is easier and why does the employer not experience difficulty in obtaining men to replace them?

There are several reasons why it is not easy for workmen of exceptional ability to get their superiority recognized in the market. To begin with, they cannot usually give simple and convincing proof of their superior ability. And even when they can, employers cannot know that they will be equally superior at other jobs. Furthermore, many managers, for fear of arousing dissatisfaction among other employees or of creating a spirit of uppishness and self-assertiveness among the men who receive more, are unwilling to pay in excess of their standard rate even when convinced that a man is worth more. If one adds to this the fact that changing one's job is pretty much of a leap in the dark, it is easy to see why a worker who is fairly well situated and who does not desire change for change's sake should not leave his place because his employer promptly appropriates without compensation his improvements in methods of work.

Why employers are able to exact a greater physical and nervous exertion for the same pay without experiencing difficulty in holding their men or in replacing those who leave was discussed in the preceding section. The explanation is found in the numerous things which disincline most workers to leave their jobs—the loss of wages, the difficulty of discovering new places which are satisfactory, attachment to friends in the shop, the desire not to change their residences —and in the fact that, however much they may desire to, seekers of

It assumes, for example, that when a firm makes improvements which enable it to produce for less, competitors will not be able to discover or to adopt the superior methods until the originating concern has had the exclusive use of them long enough to be compensated for the cost, trouble, and risk of inventing and trying them. One of the obstacles in the way of obtaining labor's coöperation in production is that employers appropriate too promptly the gains from the improved methods which workers invent.

employment are unable to discriminate accurately between plants on the basis of the severity of the work.

It is not intended, of course, to imply that employers never experience difficulty in holding men or in replacing those who quit, for, rare as is general labor scarcity, acute shortages in particular occupations and industries sometimes occur. The difficulty in holding or replacing workers, however, does not appear to force employers into recognition of merit. Rather it introduces a wage policy which more than ever convinces the workers that merit does not count. This is the policy of paying different individuals or classes in accordance with the ease or difficulty of getting or holding them. In times of brisk labor demand, for example, it is usually more difficult to get new employees than to keep old ones. Under these conditions, some employers raise the hiring rate more rapidly than the pay of men already in their employ. During the height of the labor demand in the summer of 1919, the writer was hired by a Chicago plant at several cents an hour more than was paid the man who instructed him in running his machine. Among the men on the force, the highest compensation is likely to go, not necessarily to the most competent, but to those who, because they are unmarried or have small families, are regarded as most likely to quit or to make trouble and to those who are good at talking to the foreman and are not afraid to risk their jobs by asking for more money. As a result, the workers feel more than ever that merit counts for little.

Finally, in explanation of the indifference among wage earners to their individual output, should be mentioned the general absence of systematic promotion in accordance with merit. Some enterprises, it is true, have a crude system of promotion, relying on the foreman's rather indefinite and unreliable impressions as to who is entitled to advancement. For the men to have confidence that merit will win promotion, however, two things are necessary—definite lines of advancement to enable each worker to see clearly and precisely what he is in line for, and individual efficiency records or a reliable rating system to assure the men that promotions will not be based on guess work. These conditions, however, exist in few plants. In many establishments, in fact, the best workers are precisely the ones who do not get advanced. Foremen and other subordinate officials, not usually sharing in profits to a great extent, are less interested in developing an efficient force for their employers than in keeping their departments or divisions running smoothly and in avoiding work and worry. When, therefore, a man is exceptionally good at an operation, the foreman prefers to keep him at it rather than promote

him to a job at which he may be a failure or only an indifferent success.

The second part of the problem of labor's indifference to output and costs is the question of why workmen are unwilling to do what they can to assist in increasing the production and reducing the expenses of the enterprise as a whole. Were they willing to give this coöperation, there is no doubt that their intimate knowledge of conditions would result in suggestions and criticisms of great value. The reason why employees withhold their assistance is to be found in the nature of modern industrial organization and control. The prevailing practice and theory of industrial organization are that industry belongs to those who supply its physical equipment. Just why industry should belong exclusively to those who invest capital in it rather than solely to those who invest labor or jointly to those who invest labor and capital, need not concern us. We need only notice that the workers have no direct voice in the control of industry and no direct interest in its gains. The management is not chosen jointly by capital and labor nor is it responsible equally to each. It is chosen exclusively by the contributors of property, is responsible solely to them, and is expected to conduct the enterprise, not impartially in the interest of both workmen and capitalists, but exclusively in the interests of the latter. Does the management discover how to produce in eight hours what formerly required nine or how to reduce or eliminate certain expenses? No decrease in hours or relief from the swift pace of production, no improvement in wages and working conditions automatically follows. In seeking to improve the productive process, as in all other matters, managements are acting on behalf of the capitalists, and all that they accomplish, all the zeal and ingenuity which they display, are that the capitalists may benefit. To raise dividends, not to raise wages, to shorten hours, or to improve working conditions, is the reason for which managers are employed.

As a result of the policies which the existing organization of industry renders practically inevitable, wage earners have learned that, regardless of what employers can *afford* to give them, wages, hours, and working conditions are, as a rule, no better than managements, in view of the economic strength of the men, find it expedient or necessary to grant. Consider the effect of this situation upon the attitude of workmen toward industry. If wages are working conditions in each concern depend not upon how much or how cheaply it produces but upon the men's bargaining power, what reason have the workers for being interested in the output of the enterprise? Must not their interest, under the circumstances, center, not in the productive

power of the business but in their own bargaining power? And why, in particular, should wage earners help make industry prosperous when, instead of helping make them prosperous, it seeks to pay them as little as necessary, to prevent their wages from going any higher than it can help, to keep their working day as long as possible, and to get more and more out of them by pushing up the speed of work? As long as we have capitalism—that is, as long as policies are determined and wages and hours are set by officials who are responsible to capitalists and act on their behalf—labor will give only such help in production as it is compelled to give and will resist all efforts of managements to force it to give more. Only when wage earners feel that industry is conducted for their benefit as much as for the benefit of the investors, that the object of the ceaseless striving of managements after greater efficiency and lower costs is just as much the paying of higher wages as it is the paying of higher dividends, will workers freely give the help which they now carefully and deliberately withhold.

The extraordinary nature of modern industrial organization becomes apparent when we notice that the relatively passive factor in production, the stockholders, many of whom have never seen the plants in which they own shares and most of whom can exert comparatively little effect upon the efficiency with which operations are conducted, receives a return which varies with output and expenses, while the relatively active factor, labor, which is in a position to exert a profound influence upon output and costs, receives a return which does not closely fluctuate with production and costs in the particular plant. As labor is now compensated, the workers who acquire more bargaining power reap a reward at once. Those who work harder, develop their skill, and increase their output, lacking the requisite bargaining power, as a rule not only get no reward whatever, but, by their extra skill and exertion, set more difficult standards of speed and accuracy which they must thereafter maintain. Because modern industry tends to reward bargaining power directly and immediately and to penalize hard work, better workmanship, and coöperation to cut costs, bargaining power is esteemed and respected by labor, and hard work, technical proficiency, and coöperation tend to fall into disrepute.

4. FREE CAPITALISTIC ENTERPRISE AND COSTS

The theory of free enterprise asserts that control will be maintained over costs by the elimination, through competition, of the high cost producers and the survival of those that are best at reducing

or eliminating expenses. There are a number of reasons, however, for doubting the ability of free enterprise to establish satisfactory control over costs.

The theory that competition will eliminate the inefficient enterprises assumes that costs are practically all direct rather than to any considerable extent indirect. When expenses are nearly all direct, the inefficient establishments are, of course, rather promptly forced out and competition works fairly well as a selective agency, rapidly concentrating production into the best managed, best located, and best equipped plants. When, however, costs are to a substantial extent indirect, it may pay high cost firms to continue in business simply because it is less expensive to operate than not to do so. If necessary, charges can be reduced by recapitalization. This, however, is a pecuniary operation for the purpose of reducing expenses to the competitive level in order to save as much as possible of the investment. Social costs are not affected by these pecuniary readjustments, and the recapitalized enterprises continue to be, from the social standpoint, high cost producers.

It is undoubtedly fortunate in many cases that high cost firms can continue to operate either by failing to pay the current return to their stockholders or by reducing fixed charges through recapitalization. Otherwise the fixed investment in them would be lost except in so far as it could be converted to different uses. In many cases, however, the ability of these firms to meet competition by recapitalizing or paying less than the usual return results in social loss. This is true when the greater expenses are due to inefficient administration. In this case a change in management is needed. When costs are largely direct, such a change would be forced by the inability of the inefficient executives to make operating expenses. When costs are largely indirect, many incompetent managers are not necessarily forced out. They may remain in charge and meet the competition of better administered enterprises by failing to pay the current return on the investment. This is particularly likely when the managers are the sole owners of the business or important shareholders in it. The number of inefficient business heads who retain their positions in this manner must run into many thousands. The result is that the abler business men are prevented from gaining control of as large a share of society's industrial equipment as would otherwise be the case and the community suffers from having a large part of industry directed by the less able managers.

Another reason for doubting the ability of competition to concen-

trate production into the plants which are best managed, equipped, and located, arises from the rapidly changing price level which is characteristic of modern economic society and the great importance of fixed capital in present day industry. These conditions tend to bring about the survival of those firms which build their plants when prices are low rather than of those which are most efficient. When the price level advances approximately threefold within thirty years, it is obvious that the enterprises which started early in the period have a substantial advantage over those which began later. It is true that this advantage is somewhat diminished by the fact that the older establishments must replace worn out equipment at the higher price level and by the ability of newer businesses in planning their buildings and selecting equipment to take advantage of the progress of the arts. But even though the older firms must accumulate replacement funds at a rate determined by the new prices, they derive a substantial advantage from the fact that the amount of their capital obligations was determined in large measure by the old price level. It must be remembered also that some property, such as buildings, requires replacement only at long intervals, and other property, such as land, often requires no replacement at all. Were a period of falling prices to set in, the advantage of the producers who build at lower prices than their competitors would be still greater because it would be combined with an advantage derived from the development of the arts.

The theory that competition will keep down costs presupposes that the producers who use the most economical methods will win out and that the efforts of individual business enterprises to cut their expenses will result in lower social costs. Neither of these assumptions is necessarily true. There appear to be situations in which the more rather than the less expensive methods secure success in competition and in which the efforts of individual firms to reduce their costs create precisely the contrary social result.

It seems probable—although not certain—that, in the field of marketing, competition usually results in an enhancement rather than a reduction of expenses. The economics of marketing has been too little investigated to permit us to speak with great positiveness on this point. It is possible that in certain industries the heavy expenditures on selling activities do not raise unit costs but simply make it easier for enterprises to attain the advantages of large scale production. The argument to this effect is supported by the fact that, if one firm does double the business of another, it can spend twice as much on selling without adding more to its costs than does

the second. Since greater expenditures on marketing mean more sales, the larger concerns are likely to find it easier than the smaller ones to increase their business and thus to obtain in greater degree such economies as large scale production offers.

But although expenditures on marketing may, under some circumstances, aid the concentration of production into larger and more economical plants, it is by no means certain that this is usually the result or that, when it is, the savings are sufficent to balance the cost of achieving them. It must be remembered that every firm is constantly losing business to its rivals. The more numerous its customers, the greater the number it is likely to lose to competitors and, therefore, the greater the number it must gain in order to keep its volume of sales constant. Hence the large enterprise needs to spend more than the small one on advertising and selling in order to prevent its business from declining. If, therefore, the outlays of several competitors on marketing are substantially in proportion to sales, the expenditures of each are likely to nullify those of the others so that the result is about the same distribution of business but higher selling costs to all. The more one firm expends on advertising and selling, the more its rivals must spend in order to hold their business. If one enterprise buys more advertising space, its competitors are forced to do so also. If it uses travelling salesmen, its rivals must also employ them. If it has its salesmen call more frequently, competing concerns find it necessary to do likewise. If it houses itself in an impressive building, uses elaborate window displays, distributes large volumes of free samples, allows goods to go out on trial with extreme liberality, rival establishments in each case endeavor to do the same. Notice that it is competition which is largely responsible for the innovations in marketing methods and it is competition which compels the adoption of the innovations by rival enterprises. Each competitor *must* employ them or lose out in the race for business. The new methods, however, increase rather than lessen unit expense, for they increase the burden to be borne by about the same volume of business.[1]

[1] In the case of certain products, of course, greater selling effort may so increase the sales of the entire industry that unit costs are lowered. Unless the economies of large scale production permit prices to be reduced so much that consumers are able to buy the larger output at no greater total cost than their expenditure for the smaller output—practically an impossible condition—the sales of some other products must fall off and other industries must to that extent lose the advantages of large scale production. This would probably lead other industries to increase their expenditures on selling and advertising in an effort to regain their markets and the ultimate result would probably be

Thus in the field of marketing, competition appears to raise rather than to lower costs.[1]

Free enterprise gives the business man an interest in keeping down costs and often eliminates him if he fails to do so, but it does not necessarily give him an inducement to prevent them. The incentive which the enterpriser has is simply to get rid of costs as completely as possible and by the easiest method. He can either eliminate them or shift them. If it is easier to prevent them he will use that method, but if it is easier to shift them, he will do that. Whether it pays better to prevent or shift costs depends largely upon the bargaining power of the other party and the degree of discrimination exercised by him. In an economic society such as ours, in which disparities in bargaining power are great and but a small minority discriminates carefully in buying and selling, the occasions on which it is more profitable to shift costs than to eliminate them are very numerous. Indeed, one of the outstanding characteristics of our economic order is the many costs which are in large degree preventable and which could be reduced with profit to the community, but which are not, simply because it is easier and cheaper for business

a greater total outlay on marketing by industry as a whole and a smaller total output of goods. In short, the selling efforts of different industries tend to nullify each other just as do those of individual plants.

[1] Evidence that under competitive conditions marketing expenses tend to increase in the cumulative manner described is furnished by figures published in the bulletin of the Philadelphia Federal Reserve Bank. *The Business Review* for October 1921. These show that the volume of advertising in dollars carried by seventy-two publications increased as follows from 1915 to 1920:

1915	$ 38,737,336
1916	51,837,806
1917	57,793,628
1918	61,318,888
1919	97,208,791
1920	132,414,799

Obviously the increase is far too great to be accounted for by the declining value of the dollar. Commenting on the figures, the bulletin says: "Before the war advertising came largely from the modern industries and from new firms in old industries, but during the past seven years there has been a most remarkable growth in advertising by both old and new firms in old and new industries. . . . There is a possibility that this unprecedented growth was stimulated by the abnormal conditions due to the war, but a study of some of the leading publications points to the conclusion that it has been quite natural. In one of the biggest publications, all but one of the fifty largest advertisers in 1919 renewed their advertising in 1920; and of the fifty largest advertisers in 1920, forty-nine spent as much as or more than they did in 1919. The one who did not spend as much went 66% of his 1919 appropriation."

enterprises to shift them. Unemployment, industrial accidents, industrial disease, pollution of the air by smoke or of the streams by discharge of waste in them are among the costs which are easily preventable but which it usually pays industrial establishments to let fall on others rather than to eliminate.[1]

Because it is frequently possible to shift rather than prevent costs, the producers that win out in competition are not necessarily the low cost ones. Low money expenses may be achieved by speeding men up, by failing to install fatigue saving devices, to guard machines, to protect against disease, to prevent unemployment. The less business establishments do to reduce these human costs—and in the case of speeding men up, the more that they do positively to increase them—the smaller is their outlay in dollars and cents. Under free enterprise it is often not the low cost firms—except in the superficial pecuniary sense—but the high costs ones, the ones which exact from their employees the largest human sacrifice, which win out. Competition, instead of encouraging the reduction of human costs, frequently gives an incentive to push them higher and higher up to the maximum limit which workers, handicapped as they are in bargaining, will tolerate. The price which we pay for free enterprise in the form of preventable but unprevented costs is stupendous.

The theory of free enterprise assumes that substantially all that is possible in the way of cost reduction can be accomplished by individual producers, acting independently. There is, however, no peculiar magic to the individual business enterprise which renders it able to cope effectively with all problems even of pecuniary expense. Many expenditures can be controlled only by the coöperative action of a large number of establishments. This, however, requires some sort of super-plant organization able to impose its will upon individual firms. Such an organization, of course, is incompatible with the individual freedom of choice which is the essence of free enterprise.

The expenses which can be controlled only by coöperative action or

[1] When enterprises are dealing with some one of good bargaining power they may not be able to shift costs. In the case of unskilled, semi-skilled, and many skilled manual laborers, it is usually economical for businesses to shift the cost of unemployment to the workmen by laying them off. In the case of more important employees, however, such as gang bosses, foremen, division heads or assistants, and, in some instances, machine setters and repairmen, it usually pays enterprises to bear the cost of unemployment themselves and to pay these men their wages even though there is little or nothing for them to do.

by an organization capable of regulating the policies of all or substantially all competitors are numerous and important. The wastes resulting from unstandardized raw materials, equipment, or products cannot be prevented by individual producers acting independently. In so far as labor turnover is caused by variations in wages and conditions in different plants, it can be eliminated only by joint action. The cost of progress, which, because of the fact that competition forces producers to scrap old style equipment prematurely, is far greater under free enterprise than need be, can be reduced only by controlling the rate at which new inventions are installed.[1] Another cost of progress which lies beyond the control of individual producers is that which results from the overdevelopment of an industry as a result of a new invention. If the new invention makes possible a great increase in output and if competition compels each firm in the business to adopt it, the public is compelled to pay interest, depreciation, maintenance, and insurance on an excessive investment.[2] Some sort of super-plant organization is needed to avoid the great waste in the exploitation of oil and natural gas which results from the efforts of each land owner to get a larger share of the supply underlying his and his neighbors' property. Advertising and selling expenditures cannot be kept down by the independent action of competitors. Just as one nation dare not reduce its armaments unless its rivals do likewise, so a single business enterprise cannot ordinarily cut its expenditures for advertising and selling unless its competitors do the same. The heavy losses due to idle men, plants, and equipment can be reduced only by making it safe for plants to produce during slack times in anticipation of future demand. This requires, in the case of commodities subject to fashion, that styles be somewhat controlled and, in the case of all commodities, that prices be stabilized. Unless business men feel reasonably certain that goods made during slack seasons can be sold at a profit, they will not produce in anticipation of demand. But stabilization of both styles and prices is beyond the power of individual business establishments acting independently.

A final defect in the control established over costs by free enterprise is the fact that no way is provided for avoiding the uneconomical increase in the number of business units—that is, of keeping production concentrated in plants of the ideal size and preventing it

[1] For a discussion of the point see O. W. Knauth, "Competition and Capital," *Political Science Quarterly*, xxx, 578ff.

[2] The inventions of the cigarette making machine and the wire nail machine caused great overdevelopment of those industries for the reason given above.

from being divided up among more establishments than can handle it most advantageously. The theory of free enterprise assumes that when prices become higher than expenses, coincidence between the two will soon be reestablished by competition's driving prices down. What frequently happens, however, is that costs are raised to prices by the multiplication of enterprises. Attracted by the high profits, new firms are organized which reduce the amount of business done by each producer and raise costs by increasing the overhead which must be borne by a given volume of sales. The tendency for uneconomical increases in the number of enterprises to occur whenever prices rise above costs is of particular significance in view of the fact that the business cycle is repeatedly bringing about periods when prices are high relative to expenses. Retailing offers perhaps the most conspicuous example of how free enterprise fails to limit business establishments to the number which could most economically perform the service. In wholesaling and in most branches of manufacturing, however, great economies could also be achieved by avoiding excessive duplication of facilities and concentrating production into units of ideal size.[1]

5. ECONOMIC CONFLICTS UNDER FREE CAPITALISTIC ENTERPRISE

One of the outstanding conditions in modern industry is the intense and bitter struggle between capital and labor. The seriousness of this conflict has provoked many efforts to discover a way by which differences between the parties could be adjusted. Although the search for methods of settling industrial disputes is not to be discouraged, it is important to recognize that this is but a superficial attack upon the problem. The conflict between wage earners and employers is a natural product of the organization, control, and operation of our industrial system. Indeed, antagonism between capital and labor may with accuracy be said to be *organized into* our economic order. Had we deliberately set out to design an industrial system which would render differences between these two parties highly acute and difficult to settle, we could scarcely have invented one which accomplished the result more effectively. This

[1] What is and what is not excessive duplication of facilities depends, of course, in part upon the system of industrial control. When we rely upon competition to protect the consumer against unfair prices or dishonest goods, as we do under free enterprise, a certain amount of duplication is necessary in order to provide competition. In fact, if we assume perfectly rational action, a considerable number of competitors may be necessary in order to render it worth while for any one of them to seek additional business by cutting his price.

means that efforts to solve the labor problem must be directed primarily toward altering the organization and control of industry.

Why does the nature of modern industrial organization make the differences between capital and labor peculiarly acute? First of all should be mentioned the fact that the business owner as a rule receives no fixed or guaranteed income but rather a return which is dependent upon the difference between gross receipts and expenses. *Everything* over and above costs belongs to him. This means that labor can get more only at the expense of the capitalist. Not by coöperating to increase output or to reduce costs, not by devising labor saving methods or by working harder do the employees of a business enterprise get more. By doing these things they simply increase the return of the investors. Only by wresting from the capitalist some of the income which would otherwise be his can workers raise their compensation.

The conflict which results from the efforts of laborers to increase their income at the expense of business owners is greatly intensified by the fact that in most enterprises the net income is small in comparison with the wage bill. The result of this is that a comparatively small increase in wages produces a disproportionate effect upon profits. To illustrate the divergence of interest which this situation produces, let us imagine an enterprise with a gross annual income of $1,000,000, total expenses, exclusive of return on the investment, being $900,000, and of these $400,000 being labor costs. Net profits evidently are $100,000. Suppose that the employees of the enterprise seek an advance of ten per cent in wages. This would increase the total wage outlay of the firm by $40,000, or to $440,000. Assuming that the volume of business and expenses other than wages remain constant, profits would be reduced to $60,000. *In other words, to give the employees ten per cent more would mean, under the conditions assumed, reducing the return to the owners by forty per cent.* When a moderate advance in wages means such a disproportionate reduction in profits, is it to be wondered that managements resist with the utmost stubbornness the demands of workers for more compensation? Neither party can be blamed for the difficulty of adjusting the matter, for the trouble arises from the fact that to give a relatively small amount more to the workers it is necessary to take away a relatively large amount from the business owners. If we assume that part of the enterprise's capital is in the form of bonds, the clash becomes still greater. If the interest on the bonds is $30,000, there remains $70,000 of the $100,000 for the stockholders. Giving the workers ten per cent more under these circum-

stances would reduce the return to stockholders over a half, from $70,000 to $30,000.

Were the enterprise owned and controlled by the workers rather than the capitalists, the latter, instead of receiving a variable income dependent upon profits would undoubtedly receive a fixed return. Having procured the needed capital by agreeing to pay a stipulated return, the laborers could not advance their compensation at the expense of the investors. Only by increasing profits could they raise their wages. Quite obviously the conflict between capital and labor would be greatly reduced in intensity. If the enterprise were a coöperative establishment controlled by the consumers, the investors would undoubtedly again receive a fixed, or at least a limited return instead of a completely variable one. The $40,000 necessary to advance wages ten per cent would, in this case, come out of the consumers. They would be compelled to pay four per cent more for their goods. Clearly there would be a distinct conflict of interest between consumers and wage earners but how much less would it be than that between the stockholders and the wage earners! In the one case, to give the workers ten per cent more, forty per cent must be taken away; in the other, only four per cent must be added to prices.

A second reason why the conflict between employers and employees in modern industry is peculiarly intense is the highly fluctuating character of business, both within the year and during the business cycle, combined with the great importance of indirect costs. Indirect costs, as is well known, make the volume of output of tremendous significance. In boom periods and during the busy times of the year many plants are able to obtain more orders than they can fill. If, with their existing equipment, they could turn out more, the difference in their profits would be considerable, for making the additional goods would involve little or no increase in overhead expense. The amount which an enterprise can produce with a given plant is limited, however, by the speed with which the men work and by the length of the working day. In consequence, extraordinary pressure is put on the men in busy times to increase their speed—the more so because their tendency, when jobs are plentiful, is to go slowly—and extraordinary resistance is offered to demands for a shorter working day. In times of depression and off season, on the other hand, relations between capital and labor are strained by the fact that the heavy burden of overhead costs puts business enterprises under severe necessity of economizing and this they seek to do, among other ways, by forcing up the speed of work and by cutting wages.

A third reason for the acute differences between capital and labor is the fact that wages and conditions of work are not, as a rule, determined for all firms in the competitive area at once and with the purpose of putting them on a somewhat equal competitive basis, but are settled in each plant separately. This gives each enterprise a powerful incentive to obtain an advantage by paying less or offering less favorable terms than its rivals. It also causes extraordinary resistance to demands for better wages and working conditions because the establishments which first concede them are put at a competitive disadvantage.

A fourth way in which our economic order creates friction between workers and business owners is by its selling and advertising activities. It is one of the strangest phenomena of modern industry that business men, who least of all desire unrest, should spend millions upon millions each year in creating it. In comparison with the expenditures of business organizations for the purpose of making people dissatisfied, those of the I. W. W. and other fomenters of discontent are small indeed. Nevertheless, the deliberate and systematic stimulation of dissatisfaction by industrial establishments appears to be an inherent characteristic of free capitalistic enterprise. It is inevitable that business houses should seek to extend their sales. To do this, they endeavor to make people desire things which they do not possess, to render them dissatisfied with their lot, to get them to aspire to a higher—or at least more expensive—standard of living. Influenced by salesmen and advertising experts and emulative consumption—which in turn is skilfully stimulated by business enterprises—the wage earner's wants increase more rapidly than his earnings. What is more natural than that, feeling intensely the need for greater income, he should regard his wages as unfairly low? As long as business spends huge sums on carefully planned efforts to make people discontented, individual enterprises must expect relations with their workers to be strained.

6. CONCLUSIONS

It cannot be emphasized too strongly that the foregoing analysis of the operation of free capitalistic enterprise does not pretend to be comprehensive. The purpose has been simply to test by inquiries in different directions whether or not the existing organization of industry is so completely and clearly able to function in conformity with the public interest that orthodox theory is justified in ignoring the problem of industrial organization and control. Those aspects of free enterprise which have been examined have, of course, been

discussed but very incompletely, and many important phases of its operation have not been touched upon. No inquiry, for example, has been made into the question of how far competition has been limited or abolished. It is well known, however, that the fields within which competition, particularly in price, has been severely limited or destroyed, are numerous and important and that business interests are steadily perfecting methods of controlling its intensity. In analyzing incentives, no discussion has been included of variable payments which fail to stimulate output or efficiency because they go to land owners or stockholders who have little influence upon productive activities. No examinations has been made of how fairly wealth is distributed nor of how satisfactory is distribution of goods on the basis of ability to pay, which capitalistic enterprise makes practically inevitable, in comparison with distribution in accordance with either needs or ability to use advantageously.

Incomplete and fragmentary as our survey has been, it has indicated that the faults of free enterprise are by no means simply incidental and exceptional—products merely of extraordinary circumstances rather than typical results of our industrial system. We have found that the most fundamental requirement of free enterprise—an interest on the part of individual buyers and sellers in discriminating against those who disregard the common welfare—is lacking, not in a few scattered instances, but in many. We have seen, furthermore, that even when individuals do have an interest in discriminating, they frequently lack the information, the time, the willingness, the intelligence, or the bargaining power to do so. We have observed that free capitalistic enterprise habitually underproduces, that, owing to the uncertainty of markets, it *must* underproduce if business enterprises are to remain solvent; that it fails lamentably to get managements to concentrate upon the improvement of technique and the elimination of waste and forces them into a fight for markets so fierce and of such vital importance that a large share of the best executive ability must be devoted to the struggle; that it not only fails to obtain the coöperation of labor in production, but also causes wage earners consciously to withhold their aid and often to fight against technical improvements. The control established over costs by free enterprise we have found to be seriously inadequate. Finally, we have seen that the existing industrial organization is largely responsible for a deep-seated and extremely bitter conflict between capital and labor, of such magnitude and intensity in some countries that it shakes the foundations of the social order itself.

In other words, we appear to-day to be faced with a situation, dif-

ferent in its details but not in its fundamentals from that which confronted Adam Smith. Free enterprise as a system of economic organization and control appears to have broken down as seriously as had Mercantilism a century and a half ago. Just as conditions in the eighteenth century caused Smith to feel the need of a better method of organizing industry, so the deep-seated deficiencies of free enterprise should impress us with the necessity of an economic organization better suited to our industrial technique and institutions. Indeed, the need for better methods of organizing and controlling economic activities is possibly more urgent to-day than when Adam Smith studied the problem. Modern industry operates on so much larger a scale and with so much more effective instruments than the industry of the past that imperfections in our control over its activities are extraordinarily serious. The conservation problem, for example, is acute, not principally because business finds gain under many circumstances in wasting natural resources, but because of the enormous scale on which waste occurs when it is profitable. The problem of protecting consumers against exploitation is more serious to-day than ever, because business can use science to help it adulterate its products and because it has the aid of an elaborate and highly developed technique and of many professional experts in molding the desires of buyers. If it is to the advantage of employers to speed up labor to its maximum temporary capacity regardless of the rate at which the social investment in labor is thus depreciated, the managers of to-day are in possession of carefully perfected methods for doing this. The stop watch and time study enable employers to discover with unprecedented accuracy just how much men can do and to detect the attempts of wage earners to conceal their working capacity by going slowly. Time recording devices show precisely when each machine is running or standing still and when each job is commenced and finished. Progress in the art of industrial organization has resulted in the more or less minute division of labor among executives along functional lines—a plan which gives the management better control over the force. Work is organized in a flow so that each man must go as fast as material comes to him. A rapid flow is created by stationing pace setters at strategic points. Finally, the employer who wishes to extract the last ounce of energy from his men has a wide assortment of extensively tested wage payment plans —differential piece work, group piece work, group bonus plans, standards of production—from which to choose. In short, the industrial revolution, by making business both more powerful and more expert

in the pursuit of its interests, has made the social control of business activities at once more important and more difficult.

It is not, indeed, suggested that the economics of to-day should imitate Adam Smith by searching for a cure-all—that is, a scheme of economic organization equally applicable to all industries. The efforts of Smith and of the socialists to discover such a plan indicate the futility of the attempt. Economic life is too intricate and conditions in different industries too diverse for a single form of organization to work equally well everywhere. But despite the fact that scientific economics cannot advance sweeping and uniform schemes for organizing industry, the problem of industrial organization and control is nevertheless a fit subject for theoretical speculation, and there are advantages in having it investigated by theorists as well as by specialists in other fields. The question needs to be studied not merely as a problem of marketing, banking, railroads, agriculture, or municipal utilities, but as a general problem of economics, complicated in different industries, times, and places by special circumstances. The comparative method should be used and an effort made to arrive at general laws and principles, to build up, as far as variations in circumstances permit, a general theory of economic organization and control.

All of this demands, of course, the specialist in general theory. If, however, his much needed help is to be obtained, he must drop the superstition, which too long has impaired the usefulness of his work, that the explanation of how value is determined is the central task of economic theory beside which all others are of little consequence. Doubtless the problem of value determination is of some moment—although, it should be emphasized, the conclusion by no means follows that there is great significance to the question of how value might possibly be determined under conditions which could not possibly exist. In the very nature of things, however, the problem can possess only subordinate significance in comparison with the question of how industry can be made to operate more closely in conformity with the general well-being. This inevitably is the principal concern of economics. Indeed, the explanation of value derives such importance as it possesses chiefly from the fact that it contributes to the solution of the larger problem.

Important and difficult as the problem of controlling industry in the public interest now is, it is likely to become steadily more important and more difficult. The growing scale of industrial operations and technological advance are constantly making greater the

injury which industry can do when operated in violation of the common welfare. At the same time, special interests within industry are becoming stronger, better organized, and more expert at gaining advantages for themselves. Trade union membership in this country has increased about eight-fold during the last twenty-five years and there is good prospect that it will continue to grow at a substantial rate. Union financial methods and finances are steadily improving, the government of individual organizations is being more and more centralized in the hands of the higher and usually more capable officials, the ability of labor leaders appears on the whole to be rising, unions are beginning to employ expert technical assistance, and they are constantly learning by experience how to improve their strategy and tactics. Business men also are becoming better organized, more keenly aware of their common interests, and more skillful in limiting or suppressing competition among themselves. The staff of technical experts in the service of business is growing larger and representative of more numerous fields of knowledge. The rapid development of the art of business administration is particularly important, for it makes the enterpriser better able to do good or ill as his interests may dictate. During recent years the scientific method of research has been applied to business administration and many institutions of higher learning have included in their curricula courses on the art of running industry in the interest of business owners.

Thus we see that, as time passes, the strain upon the traditional methods of controlling industry becomes more severe and the necessity of improving their effectiveness and of inventing new instruments of control becomes more pressing. Just as the rapidly increasing effectiveness with which war is waged renders it more and more essential that we discover how to prevent wars, so the growing scale of industrial operations and the greater effectiveness with which special interests within industry operate make better social control of economic activities more and more imperative. There is an endless race between, on the one hand, the rate at which the natural sciences and the technologies increase the scale and effectiveness of industrial operations and special interests develop methods of controlling industry to their own advantage and, on the other hand, the rate at which economics discovers better methods of making industry serve the public. The chief dangers are that economics, handicapped by inability to use laboratory methods and by the stigma placed upon the inventive mind when applied to social rather than to natural phenomena, will fail to discover new methods of controlling industry

for the public benefit as rapidly as special groups devise ways of controlling it for their particular interests, and that the public will be too indifferent to its own welfare, too custom bound, and too much under the spell of propaganda from interested groups to permit the departures from traditional arrangements which may be needed. The teaching of Adam Smith concerning industrial organization and control prevailed despite opposition because it coincided—in Great Britain at least—with the interests of the rapidly rising manufacturing and wholesale classes. Possibly the economics of the twentieth century may work out a theory of industrial organizations and control which will command sufficient support from organizations of consumers and wage earners to be put into effect.

ECONOMICS—SCIENCE AND ART

by

GEORGE SOULE

ECONOMICS—SCIENCE AND ART

Although generations of natural science passed before men of affairs imposed full confidence in men of science, the domain of the physicist or chemist is now taken for granted. It is significant that no such harmony has appeared between statesmen and industrial executives on the one hand, and the social scientists on the other. This hiatus has been most remarkable of all in the case of economics, which assumes to give an account of practical affairs. What nation built its battleships, devised its aëroplanes and its high explosives in the late war, without enlisting all possible aid from the exact sciences? These sciences gave aid, with horribly exact and efficient results. Yet the vitally important problems associated with financing the war and resuming peace have been so bungled as to put the life of a continent in jeopardy not merely without sufficient consultation with the leaders of economic science, but without any clear or authoritative word spoken from the realm of tested knowledge. Such few voices of warning as have been lifted have jangled with others carrying at least a passable reputation, and all have been stifled in a flow of ill-founded opinion and interested propaganda.

It is commonly said that economists are at a disadvantage as compared with other scientists because their advice depends for its effectiveness upon widespread adoption by millions of persons whose habits or prejudices may be immediately bound up with uninformed behavior. This is hardly more true of economics than it is of medicine, especially of social hygiene. It is no more true than of the sciences which underly the development of the automobile. All unfamiliar knowledge has to make its way through a crust of custom, and against the vested interests of an existing state of belief. The plain fact is that whereas most people trust the word of the natural scientists as a matter of course, neither the ordinary leader of public life nor the ordinary private citizen has, until within a few months, thought of accepting economics as body of contemporary and exact knowledge from which guidance may be derived in action. Economics has rather been used as a Scripture, as a revelation to prophets of the past, from which texts may be hurled at nonconformists, but which is not closely applied in the life of the orthodox. Many of

those who scoff most at the naïve proposals of Ford and Edison for a commodity money are most ready to embrace a protective tariff. The "inexorable natural law of supply and demand," is invoked to pacify the multitude most often by those who strive to effect quite human and willful alterations of both demand and supply.

In one sense the primitive state of economic science has been responsible for this situation and in another sense the attitude of many economists toward their science, which in large measure prevented them from recognizing its primitive state, is also responsible. The founders of the classical school, to be sure, were alive to the desirability of developing systematic knowledge akin to the certainties of the natural sciences, which might be used as a basis of private, national and international policy. They worked under the disadvantage, however, that the analogy between the two kinds of science was not so literal as they assumed it to be. They were further handicapped by the fact that even if they had known how to apply the best methods, their proper material was not systematically available, and that the statistical tools of their thought had been but little developed. The result was too quick a transition from induction to the general conclusions from which deduction was practiced, and too much reliance on introspection and guesswork even for the inductive processes. This necessary fault in the pioneers was exaggerated by their followers, and in some cases was even exalted into a conscious method. The classicists, as most economists now recognize, improvised their psychology. While psychology has since developed as an independent science, edging more and more toward experimental method and quantitative testing, most of the older economists took it for granted that there was something final about the psychological assumptions of the classicists, and largely lost touch with the growth of scientific psychology. The classical schools also were without the benefit of modern anthropology, which has revealed so many varieties of communal life and economic mores. Sociology is still perhaps in an even more primitive state than economics, but it is likely to discover important principles of social organization and development which must alter the tacit assumptions of the early economists regarding social institutions. The ingenious hypotheses about economic phenomena were too early elevated into "laws," while the many variations and the processes of change and growth in economic life were not closely enough observed. The lack of a sufficiently exhaustive period of faithful observation and recording of phenomena before conclusions were drawn led to the building up of bodies of

economic doctrine which more resembled closed systems of metaphysics than an account of the real world.

The spectacular incident of Newton first observing the fall of the apple and then, after some experiment, stating the "law of gravity" is an illustration of the method which was at first conceived proper for the human sciences. The observation of a limited portion of contemporary economic activity was thought a sufficient basis for the elaboration of natural and unchangeable laws of economics. The imperfections of the analogy were not detected. Even Newton's law of gravitation may be subject to considerable modification by the discoveries of modern physicists, but for the moment ignoring this realm of discussion, there are large differences between the material with which Newton worked and that which was the subject of the economists. In order that Newton's deductions might have validity, it was necessary to assume that one body of given mass in a given relationship to a system of bodies would behave like any other body of like mass in the same relationship to a like system, that such dominant identity of behavior extended throughout the physical universe, and that it would not be changed in the passage of time nor by any other factor with which the human mind could reckon. It was acknowledged, of course, that in practice minor variable factors existed such as resistance of the air, but these could be eliminated for purposes of experiment, and could easily be recognized and measured in the development of technology, where they could not be eliminated. Newton's assumptions may not have been theoretically true, but they were practically true enough to form the basis for a useful technology in dealing with matter. Such assumptions, however, are far from true in the crude sense in which they have been applied by economists to the behavior of human individuals and society. The "economic man" is not a counterpart of the apple in a vacuum. Doubtless there are innate and unchangeable determinants of human nature, but modern psychology, biology, and anthropology have shown us that such universal qualities make up a far smaller part of the phenomena of human behavior than they do of the behavior of falling apples. We are not even yet sure what the so-called "instincts" are. In practice they are given innumerable forms by all sorts of circumstances, and our equipment for measuring such variations is still slight. Whereas, therefore, the natural laws of physical science are practically true, true enough to constitute a basis of action, the natural laws of classical economics include margins of variability and uncertainty so much wider that in many cases they are practically

not true at all. The usual defense of such laws in the face of evidence that they do not "work" is based on the analogy with physics—that while they are theoretically true we must expect modifications due to circumstances, as do the physicists. The answer to this defense is two-fold; in the first place we have not yet sufficiently analyzed the kernel of universality to know certainly whether such "laws" as have been stated would be even theoretically true in a social vacuum; and in the second place the atmosphere of circumstance is so much more important to man-behavior than it is to apple-behavior that before we can state laws which have any certain practical truth we must employ much more analysis of the circumstances than the followers of the classicists have ever used. It may even prove that the laws of such circumstances are so much more influential in the result than the laws of innate human nature that they are the determining factors.

The premature flowering of economic theory seems to be chiefly responsible for the separation of economics from practical life. Having elaborated closed systems which did not sufficiently account for phenomena, and having claimed for these systems a universality and permanence similar to the natural laws of the exact sciences, the older economists of course were not prepared to recognize or account for economic development. In many cases even an ancillary ethical value was attached to the principles announced. It was felt that justice and peace could not be had except by the recognition and acceptance of the eternal natural law. Only human perversity stood in the way of economic welfare. The ideal world in which competition was free and universal, in which the distribution of income followed nicely the contributions of various classes or individuals to production, in which the government was merely a policeman for the natural law, but never an instrument of frail desire, was perhaps not the utopia of equalitarian aspiration, but it did create a bias in its own behalf, so that anything which seemed to tend away from it was discounted or condemned. New economic devices in the real world such as the monopoly of industry or the trade-union or the consumers' coöperative society were by some combated; by others they were reconciled with the existing body of theory through various compensatory devices. The ideal world was for instance conceived as "static" and the real world as "dynamic," the dynamic circumference continually revolving about its static axle, the dynamic curve passing above and below its static axis. The imaginary system of economic universals, which was the necessary foundation for the deduction of economic law, prevented the recognition either of the

actual world or of unrealized possibilities. It brought about a feeling that attempts to control economic phenomena through the exercise of human will or ingenuity were fruitless and hence probably immoral. There arose a tendency to look askance upon the economic inventor.

Inventors, as everyone knows, are likely to be impractical persons, with heaven-sweeping ideas incapable of fulfilment. Especially is this true of inventors in a field where science has not established a recognized foundation of fact and principle. But in the physical realm the inventor is now honored, even exalted beyond his deserts. People have seen and tested his results; he is established by performance. The physical sciences have flowered into a series of technical arts where the ingenuity of inventors is controlled by knowledge; the process of improvement in material affairs has become institutionalized, and invention is now a coöperative and recognized process. But invention in economics is even yet distinctly unorthodox. Not until recently has there begun to appear a technique or art of useful economics. Some economic inventors have been evangelists of utopias, likely to land in prison for using freedom of speech in a way which tends to upset the existing economic order; others, throwing over the body of orthodox economics and having no other solid basis to build on, have been discredited as impractical.

This is both a sign and a cause of the barrenness of premature senescence which has existed in economic science. It is profoundly untrue that the proper scientist is concerned solely with eternals which have no result in human activity. To remark this is not to confuse the scientist with the inventor, or the universe of pure science with the function of applied science. Some natural scientists may not be concerned with the results of their discoveries on human events; they may regard the pursuit of knowledge as a good in itself, whether or not use may be made of their conclusions. No scientist is worthy of the name who allows his view of the facts to be clouded by a desire for a given outcome.[1] Yet some of the most beneficial discoveries have arisen from disinterested intellectual curiosity. The progress of the exact sciences has in almost all cases been accompanied by the development of a dependent art. This is less true of astronomy than of medicine, but it is true to an increasing extent as the subject matter of science passes over into the proximate interests of mankind. An ultimate test of truth is the ability to act upon it. The concep-

[1] It should be remarked incidentally that the bias caused by a desire to sustain enunciated theory is perhaps more insidious to the scientist than the bias caused by a desire to affect human welfare.

tion of the "pure" science is essential only in describing the disinterested attitude of the scientist toward his material, not in separating theory from action. And just as the useful art is dependent on the valid science, so the validity of the science is tested and increased by the fruitfulness of the art. Each fertilizes the other. The fact that economics, which deals with a large section of the very stuff of daily life, has not yet a recognized art indicates that it is not yet a mature science.

A rapid growth toward maturity has recently set it, however. It has been induced partly by a consciousness of the inadequacy of the older theory, first on the part of the institutional economists and next on the part of those aware of its psychological deficiencies. Much more important, however, has been the increased pressure for making the science practically useful, accompanied by the vast new body of organized material furnished by the war, and the adaptation of statistical and other methods for use in quantitative economic research. The regenerative influence of quantitative analysis in a scientific situation such as has been described is easy to account for. A false inference may easily be drawn from introspection, or from the observation of a few isolated cases. The observation and measurement of large results involving many cases often reveal the presence of significant exceptions, or of unsuspected factors which must be further analyzed before the truth can be known. They eliminate the wholly mistaken theories. They furnish a dependable body of fact concerning economic behavior against which guesses and hypotheses may be checked. Consider, for example, the problem of the business cycle. Before the war we had numerous hypotheses concerning industrial depressions; we had Wesley C. Mitchell's observation that the phenomena of booms and depressions constituted a cycle, we had crude statements of the quantity theory of money, we had Irving Fisher's early proposal for a compensated dollar. In all this there was no single certainty and the discussion was carried on chiefly in the limited circles of the élite. As far as the business men or the general public were concerned, they still moved in the mythology of crises caused either by political campaigns, by the crops or by some personal Devil. We had all sorts of guesses about the future business weather by "practical men," based on hopes, fears, advantage and ignorance. Soon, in response to a demand of the more adventurous, began the flowering of the various "dope sheets," from such improvised "laws" as that of "equal and opposite action and reaction," coupled with some quantitative information. The war gave us the crucial experience of inflation and deflation. With it came the

vast amount of fairly good data on prices, wages, profits, production, employment, money and credit. Most of the best economists interested in the subject left their grazing on the arid hillsides of traditional theory and began to crop the juicy lowlands of fact. The result was a growth almost miraculous. We do not yet know the secrets of the business cycle. But we have immensely narrowed the field of inquiry. General discussion of the subject is more often carried on in the universe of intelligence. Business men and trade unions are beginning to apply well calculated hypotheses to well apperceived current situations, with the result that at least we have a series of semi-controlled experiments. The technique of measurement and of graphic statement of the cyclical phenomena has undergone a bewildering expansion. In this realm economics is beginning to be an applied science. An open-minded analysis of quantitative data has furnished new hypotheses and has given greater precision to the old. Theories are becoming good enough to be consciously tried. Such experiments will result in better theory. They are also leading to carefully devised economic inventions—such as unemployment insurance. In one spurt, and almost without consciousness of the fact, we have broken through the closed circle of the old economic universals; the result being at once a more useful practice and a more vital theory. Nobody knows what doors of knowledge may yet be uncovered in the theoretical excavation of the business cycle.

More of this sort of inquiry must be completed—much more—before we are ready to return to basic generalities from which deduction is possible. We shall not have solved all practical economic problems when we have discovered how to eliminate the business cycle; indeed it may prove to be a broader statement of this truth to say that we cannot eliminate the business cycle until we have surmounted many other obstacles which now seem but distantly related to it. In this type of research the enduring work of economists will probably be done in the next few years. It is easy to suggest problems of practice capable of being approached through quantitative (as well as qualitative) analysis, toward which attention may fruitfully be directed. The problems associated with the accumulation of capital furnish one such complex of puzzles. What are the various methods of accumulation of productive capital? What are their effects on production and distribution? Is capital accumulated too rapidly, or too slowly, or at the correct rate for a balanced growth of consumption? Is it accumulated in the best places? How may its accumulation be made subject to social control? Given the existing quota of capital goods, natural resources and population, and given

the rate of growth of productivity, how rapidly may real wages and other incomes be increased without interfering with a desirable growth of capital? These and dozens of questions along other lines of inquiry are of high practical import. Such questions implicitly negate any closed system of economic absolutes which preclude conscious change. They cannot be answered without the accumulation and analysis of raw data which will contain the gold particles of theory. After enough pay dirt has gone through the pan, the particles of theory may be collected and melted into new systems.

It may be objected that such concrete inquiries necessarily affect the interests of certain classes or groups in the community and hence that research of this nature cannot have the impartiality required of truly scientific study. This is another aspect of the same confusion of thought before noted. The accomplishment of a certain few economic ends may bring equal material benefit to everybody. Such ends, however, are fewer than would be suspected without a close look at the matter. The elimination of the business cycle, for instance, is not one of them, for speculators and those clever enough to retain speculative profits in ordinary business would lose if the cycle were eliminated. Scarcely any economic readjustment can be made without at least temporary or relative damage to someone. The absence of economic change would cause injury to those who might gain by readjustment. It is impossible to be, or to think, in this world, without affecting the lives of others. Why then, not acknowledge the situation, and begin by deciding what ends we have in view? Careful definition and acknowledgment of such a bias—if a declared end may be called a bias—is likely to lead to greater honesty and carefulness in method than suppression of one's prejudices and ignorance of the fact that one's activities do have practical results. To some temperaments the end chosen will naturally be stated in abstract or general terms, to others it will mean greater advantage for certain groups of persons—either inclusive or factional groups. Whatever the end, however, it may best be achieved, if it is capable of achievement, by a careful analysis of phenomena. This necessarily involves the progress of science. Various interests can agree as to the facts and as to the explanation of their relationships. Adjustment among interests on the basis of exact knowledge is perhaps more hopeful for the general good than vague attempts to bring about unanalyzed improvement. Whether anyone's particular end may be served or not, the knowledge gained in the attempt to find a means of achieving it will remain.

As more quantitative analysis of economic phenomena becomes

available, the economists may make more fruitful contacts with the other human sciences. We do not yet know enough about the crude material of economic behavior to be able to make much use of the newer scientific psychology, elementary as its results still are. Enough may be discovered about the circumstances of economic behavior to enable us to judge how much as well as how, such circumstances bend innate human tendencies, whatever they may be, in specific directions. Eventually the two sciences will merge at many points. Both will join with sociology, anthropology, and political science. But economists will be well advised if they profit from the early mistake of aiming too soon at laws deduced from generalities which other sciences have still to investigate. Wherever, in devising hypotheses, assumptions must be made, they should be clearly labelled, so that as soon as the true stone of tested knowledge arrives, the scaffolding may be replaced or destroyed. At present the structure of systematic knowledge which in the end will enable us to order human relationships is hardly begun. Much of the material has not arrived. There is not even a good ground plan. By the same token, very little is yet surely known to be impossible.

We are sometimes inclined to be depressed by the vast confusion of human affairs now existing, which involves so much misery, and so little definitive achievement. Yet the present trend of economics should lead us to be profoundly hopeful. Economists are abandoning the theory that the present tangled jungle is necessary and eternal. They are abandoning the allied theory which substitutes a compensatory satisfaction in an ideal and absolute world for a recognition of the real world. Humble before the facts, they are striving to comprehend what happens. Audacious before the future, they are attempting to cause new things to happen. Both attitudes add to knowledge and to power. If the consequences are nearly as great as the consequences of like method in the physical sciences, the next century or two may mark the achievement of a virtual mastery by man over his social institutions.

EXPERIMENTAL ECONOMICS

by

REXFORD GUY TUGWELL

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EXPERIMENTAL ECONOMICS

1. CHANGE AND EQUILIBRIUM

It is true that there are, in the life of man, certain cool, high interims of peace, of close-walled tranquillity; and to some men these are the most precious moments and all the rest, being fevered, seem at the time and in retrospect like the phantasmagoria of a long delirium. But even granting their desirable quality, moments so hushed and so serene are rare; usually they come too only as a reward for conscious withdrawal and seeking after quiet. And this is essentially foreign questing for human minds. It seems anomalous to say that peace, which appears at first like the eternal condition of matters and forces in the limitless inertia of nature, is a good seldom achieved by men and not, after all, very much worth the effort, considering the stuff of which we are made. But one has only to contemplate the manifestations of unease within himself—to say nothing of the evidence, beginning to be so abundant, that psychologists offer upon this point—to realize both its unapproachability and its essential sterility.

Whether it should be so or not, or whether or not it is so arranged in a great economy beyond the dimensions with which we are familiar, man's restlessness is a far more normal characteristic, struggle for achievement a more satisfying occupation, and hard-won battle a greater good. The motors within us sing a long song. The feelers of our minds seek constantly for the wherewithal to exercise, in some way or other, that contriving intelligence that sits within, cloaked with many mysteries, overlaid with crusts of crude experience and capable of the most astonishing performances; remaining cramped in the most curious forms; turning restlessly; twisting; convolving; it almost seems, actually—seeking. This something in man[1] fumbles

[1] Woodworth speaks of it in these terms: "A variety of exploratory reactions are provided by nature . . . Closely related to the exploratory reactions are those of manipulation, and experimenting with things to see how they behave. We have in this group of reactions the germ of activities that lead to knowledge . . . When a child or a young animal is well and fresh it is not sparing of muscular activity, but goes through a variety of movements with no apparent stimulus or object in view. Probably slight stimuli are present, but it may at least be said to be a part of the native equipment to be active in a motor way, as well, indeed, as in the way of exploration. . . . *Dynamic Psychology*, 49–50.

urgently as a babe fumbles for his mother's breast, a boy for the tools he needs to build his imaginary castles, a girl for the materials of her dolly's dress. But something in nature is like the child's mother, stilling the creature's restlessness, attempting to provide enlarging interludes of placidity. Mothers are relentless, pacific enemies of change; nothing can be so perfect in a mother's eyes as a babe at the breast; no change in a child can be for the better. So nature, in a part of her, seems to feel that nothing can be so perfect as the present which is her child. She has a passive strength which seems to seek its preservation. That other force in nature which is not passive but dynamic, however, sets itself to build castles as boys do on sandy beaches or as they build waterwheels on meadow brooks—to upset her equilibria. Man being restless and exploratory, exemplifies the curious dualism of nature—change and the resistance to change.

Social adjustment and peace among men, in any society where these dynamic forces intrude upon inertia, can never be perfect. Perfection would involve settled modes of reacting to stereotyped stimuli. There could be no individually differentiated motives within man's mind; and there would be implied a set of fully developed and static institutions. Such perfection has been approximated, probably, at certain periods in the past; more nearly, at least, than we have known it to be in our time, though the approximation, after all, can only be said to have been relative. For changes finally have always destroyed the old orders in preparation for the new. The Greece of 500–300 B. C. is a most remarkable example of this if we may judge by the fruits it bore; here there seem to have been all the elements of a golden age, psychologic, economic, and politic, flowering in a perfect state and in a philosophy, a science, and an art in such glory as never was before and never has been since.[1]

Mediaevalism also must have produced a culture, such as it was, that approximated equilibrium[2]; certainly the civilization that could spend hundreds of years in the building and adorning of the great cathedrals was one in which the dynamic element was not of memorable importance.[3] The same perseverance and industry expended

[1] Cf. Taylor, *Ancient Ideals;* Zimmern, *The Greek Commonwealth;* Keller, *Homeric Society;* and Marvin, *The Living Past*, ch. 4.

[2] Cf. Taylor, *The Mediaeval Mind;* and Marvin, *The Living Past*, ch. 6.

[3] Cf. Adams, *Mont Saint Michel and Chartres.* Also for the recaptured spirit of Mediaevalism, Walter Pater, *Imaginary Portraits*, "Denys L'Auxerrois"; also Paul Claudel, *The Tidings Brought to Mary: A Mediaeval Mystery;* Charles Reade, *The Cloister and the Hearth;* and Romain Rolland, *Colas Breugnon.*

upon the material showing forth of a single idea is a kind of effort not to be thought of in our transitory way of life. But for all its unthinkableness to us now this unity of ideals and the enduring drive to carry them through may recur. The tempo of change which has accelerated so rapidly since 1750 may slow down and yield, at length, to nature's pressure for adjustment and equilibrium.[1]

It is worth noting that the equilibria of society—in so far as they have been approximated—have possessed quite different characteristics in different ages, that civilization has come to rest with new orientations and a new economic basis in every cyclical slowing up. The equilibrium of Greece rested upon favoring natural conditions and simple physical wants. The city-state could develop there, consumption could find unusually harmonious norms, and the Greeks could come to the point of culture that provided the audiences, finally, of Euripides, and a people who could understand the subtle restraints and the subjective mechanics of the Acropolis. The equilibrium of the Middle Ages rested upon a restricted local culture, continuing poverty for the masses, and a corollary forgetting of self in the glorification of God and His heavenly Utopia. Its contrasting institutions were the mud huts of the serfs upon the one hand and the castles of the lords and the cathedrals of the church upon the other. It could not flower in Greece's glory, but it was static, and the favored class, the ecclesiastics, brought to maturity what flower there was. And so there were created the vaulted arch and the flying buttress and here and there a perfected union of elements.

But a modern equilibrium would have to rest upon a more complex culture and primarily, I think it could be said, upon an intricate and delicately interrelated network of industrial forces.[2] The conditions of life have moved from simple to complex. Every addition to the diet—and think of the number of such additions since the time when Epicurus sat in his walled garden eating brown bread, goat's milk cheese and honey!—every introduction of new personal services; every change in the means of transportation of goods or people or intelligence; and especially every change in the intimate

[1] For a discussion of the tempo of change and the causative factors see William Fielding Ogburn, *Social Change.*

[2] John Dewey, *Reconstruction in Philosophy,* 71–2: "When chemical fertilizers can be used in place of animal manures, when improved grain and cattle can be purposefully bred from inferior animals and grasses, when mechanical energy can be converted into heat and electricity into mechanical energy, man gains power to manipulate nature. . . . The mechanization of nature is the condition of a practical and progressive idealism in action."

things of common use, not only has made the resulting life less simple but also has made differences in the nature of the changes that must come after. All prognostications are thrown out. As any one knows, an extensive catalogue of such changes could be made.[1] And the coming of each change, through contrivance, introduction, and spreading, has created a situation in which every instrument and every idea that was in the world before, including customs and institutions, had, in some way, to become adjusted to the new thing, whether it was toothbrushes, chrome steel, or chocolate; steamships, plate-glass or grape-fruit. And something in nature has seemed to oppose their coming in.

Greek civilization was built upon one series of forces; the culture of mediaevalism upon another series; and we are here attempting the building of a civilization upon yet another series—fundamentally the forces of nature herself. In a sense, in spite of a favoring climate and location, the Greeks found it necessary to exploit men—Athens was a city of a hundred and thirty thousand people, a hundred thousand of whom were slaves—and the mediaeval barons and ecclesiastics certainly exploited men; but we are here attempting to free men and to equalize their rights. And this we conceive to be possible by turning the tables upon nature, by making her passive resistance yield to her own dynamic forces. It was the complex of discoveries, inventions, ideas and ideals that we call the industrial revolution that made this possible, for the very essence of the revolution was the change in man's attitude toward natural forces. Man had, until then, thought of himself as very much at the disposal of nature;[2] but the industrial revolution was the turning of the worm. Nature is now becoming the slave, man the master. And this is the significant difference between the older golden ages and the one we now approach.

[1] Think, for instance, how the typewriter and the calculating machines have altered the conduct of business, how the use of gas and electricity for cooking and the invention of aluminum kitchenware have affected the preparation of food, how the discovery of steel-hardening alloys has made possible new and finer instruments of precision (and so scientific advance), how the use of concrete has affected the construction of city buildings and country roads, how the cultivation of corn, potatoes, turnips and tomatoes—all unknown to the ancients—have affected human diet, how the use of soap, toothbrushes, and underwear has affected human comfort!

[2] I mean *most* men, of course, for there were Bacon and the others like him who came before and after, who foreshadowed the ideas we consider modern but were without the modern means of achievement—which could only come through cumulative accretion.

We move toward our apotheosis, the golden age of the machine and a vastly complicated equilibrium of forces in which the fabric of reality will be close-knit and delicate but strong to protect man from the rigors of mere existence and so to free him for his greater adventures upon the earth and, as it now begins to seem, among the stars! It will not be a perfect or a permanent equilibrium. Like other golden ages it will possess within itself the seeds of change and the possibility, though avoidable, happily, of a dark age to follow. But the changes will perhaps be for a time more minute, more in the nature of refinements upon already existing fundamentals, than were those that swung the world away from mediaevalism and into what Proudhon so vividly named "industrialism." The passivity of nature will have its way again for a time. There may be an interim, a period of comparative adjustment, and something like peace.

Present problems, however, take their color not from the probable future, though it helps in their solution to have a notion of the future; but from the shaking of the world's floor upon which we stand, and from the causes of the disturbance—the series of interactive changes that destroyed root and branch the old culture of mediaevalism. They were basically industrial, these causes, rising out of the audacious attempt of man, with his new machines, to make nature's elements serve him hand and foot as Roman emperors required service of their slaves. This is true of all modern problems, whether we attend chiefly to the decline of the home, the decay of the church, the rise of the school, the ugliness of urbanism—or any of the similiar problems that vex the minds of modern thinkers.

2. THE NATURE OF AMERICAN PROBLEMS

The main concerns of life may be supposed not to have altered very greatly since the earliest times of human association. But there are some interests that have been forced into a new prominence by the developments of the last century or two. There existed always the one business of the provision of subsistence and the other of maintaining some kind of workable relationships with the others of ones' group; and there always has been more or less interest in such affairs as religion and art. But not until recently has it been necessary to consider, for instance, what ought to be done with an economic surplus, and for a very good reason: there never before has been any surplus, not, at any rate, for the Smiths and Browns and Joneses, common folk. This is one important and entirely new human problem. Also never before have common men been faced with

religious problems, and the problems of art and science, as we are faced with them; and never before have there been problems of factory and city life as we have them now that we have gone so far over toward a factory-office-city order of things. And insofar as the problems are not really new, but merely are new phases of old ones, the change of phase has been so great as to upset all the old solutions; the modern phase is complicated, intricate, many-dimensioned. And Smith and Brown and Jones, with their common heritage of ordinariness, are puzzled and exasperated by their failure to grasp the whole nature of problems or solutions; they face reluctantly the choices they are forced to make quite blindly in their stubborn attempts to do the right thing by themselves and those whom they love. There is a persistent feeling of incompetence and frustration in them,[1] and it is partly because they are ordinary, of course, but also because the world has moved away from and beyond ordinariness, has got finally to the point where its functionings are hindered because men cannot grasp its modes of behavior nor predict even imminent turns of events.[2] Our ancestors if they had to set forces in motion which were certain to so complicate life ought to have felt something more of an obligation to raise the levels of intelligence that should enable us to control the forces of the new world and to turn them to the account of human needs.

One half of this difficulty obviously calls for a selection and training of human nature. It is the business of the biologists and psychologists to define ends and means here. But the other half of the difficulty calls for a more realistic and understanding analysis and explanation of the working forces in our civilization so that the real needs of men may be visualized and finally met. And this is the business of the social scientists and, of these, not least the economist. For any examination of the problems of modern life which the Smiths and Browns and Joneses must try to solve, show how deeply they are embedded in a setting of industrialism; and this is more and more true as time goes on, for industrialism is rapidly sucking up the energies and shaping the lives of every individual who lives upon the common earth with all the rest of us. The modern aspect of these problems is recent; it began with the industrial revolution and took man by surprise. Perhaps a list of these "facers" that common men must meet, partial though it must be, will help to visualize this common setting of them all.

[1] Sometimes developing into what is known as an "inferiority complex."

[2] Cf. J. H. Robinson, *The Mind in the Making;* and H. G. Wells, *The Salvaging of Civilization.*

The Social Problems of America

1. Problems of the working life.
   a. Conditions of the working life: monotonies, dirt, noise, long hours, bad lighting; surroundings with swiftly moving machines and ugly walls, industrial disease, intermittent work, inefficient and unsympathetic foremanship, etc.
   b. Incomes; the difficulties of correlation between changing standards, changing price levels and wage or salary rates.
   c. The unsuitability of modern production for the utilization of creative abilities.
   d. Conflicts involved in competition among individuals and groups.
   e. The struggle toward coöperation and coördination of industrial individuals and groups.
   f. The continual changing of the natural resources and supplies of power depended upon by industry.
2. Problems of the home life.
   a. The passing of rural culture, the growth of urban culture, the consequent destruction of the old home life and the struggle toward a new basis for family grouping.
   b. The relations between husband and wife and between parents and children under the new conditions.
   c. The struggle to raise living levels and to meet the conditions of new ideals of life all of which involve enlarged consumption.
3. Problems of smaller group relationships.
   a. The decline of the old religion and the longing for a new religious experience with a recognizable relationship to daily secular experience.
   b. The effort to build a new morality for social rather than individual control; the enforcement of morality by the smallest social groups.
   c. The movement of educational responsibility out of the home and into the schools.
   d. The decline of individual arts and the attempt to create industrial and social arts.
4. Problems of greater group relationships.
   a. The slow struggle toward a recreation on a functional basis of governmental structure.
   b. The relations and inter-relations between producing and consuming groups.
   c. Problems of war and peace and the resolution of the conflicts that lead to international wars.
   d. Problems raised by the modern mixtures of different races and cultures brought about by modern migrations in search of higher living levels.

If we read newspapers and magazines, if we listen to workers' talk, if we study the thoughts of the philosophers and the prophets of the people, we learn there the urgency of every problem listed here; and we begin to understand how the minds of men everywhere are troubled by a morbid restlessness. Never have superstition and rationalization been so prevalent and never so dangerous; never has the need for clear thinking been so great and the difficulty of getting it been so seemingly insuperable.[1] And these are antecedent to the pessimism that has been spreading throughout the intellectual world for half a century—until the constructive phases of modern thought seem to the student either to be confined to the very narrow wedge of advance within each science or to be almost smothered in vaguely spreading fog of futile gloom.[2] But the common man cannot retire, even though he would like to, altogether from the fight. Although he drugs himself with alcohol—when he can—and with professional sport and with a press and movies that, by limiting themselves to thirteen-year-old appeals for response, give him some return of his lost sense of assurance, he nevertheless is often pressed by the force of circumstances close up against the machinery of industrial life. And he must wrestle with the dilemmas of that life. He must become the master; in a way, it is the end of humanity altogether if he gives up, if industrial events are just unquestioningly allowed to happen.

So there is serious talk sometimes in factory, field, street and home. The philosopher who has some faith that mankind is not necessarily doomed by a tragic fate, goes to those places to find the definition he needs of the tasks of the modern intelligence.

There he divines in the rough speech of the men who work a pathetic fumbling toward solutions. He sees the movements of alignment, dissolution and realignment as men are persuaded this way and that; he sees the need of definition and clarification, of honest issues for thought. And very early he learns that the problem of most press-

[1] Cf. Walter Lippman's discussion of the pseudo-environment in his *Public Opinion*.

[2] It is to be found in such widely separated places as Germany in Schopenhauer and Nietzsche, France in Anatole France, Rolland, Barbusse and other moderns, England in Hardy, Russell, Conrad and numerous others, Ireland in the whole modernist movement, and, in the Latin countries, Unamuno's *Tragic Sense of Life* seems to represent as well as one book very well could, the whole attitude of men. In America the greater part of the young generation of writers and teachers seems imbued with a profound disillusion and an abiding sense of the futility of effort. Emerson, Whitman, James Patten and Dewey may as well never have lived for all the influence they have had upon most of the younger men.

ing urgency to most men is the problem of their work. It engages most of their time, of course, and the best of their creative ability—or they are willing that it should, though too often routinization has limited and checked the utilization of this seething force within them. The seriousness, to men, of a grievously unhappy working life is proportional to the importance of that life. These are the things that are vital. They engage a passionate partizanship.

Easily first in the lives of men are the problems of their jobs; but easily second are the problems of their home lives, the situation of men and women who have loved, been swept into marriage and have created families. People talk about these matters everywhere; and one of the reasons why they talk so much about them is that something has happened to the home, something very disturbing to a group that has a definite tradition and a complex set of emotional associations that are grouped about a disappearing institution. It might almost be said that the home, as the term was understood a couple of generations ago, no longer exists, or that it exists only, perhaps, as a survival and so holds no significance for the future. Homesteads in the American rural tradition were the focal points of social life. Industry centered there; education too. And it had an impressive material embodiment. It was set off by itself and decorated fondly as a good to be prized above all other goods. But now it has been reduced to a merely temporary abode, often of only a few miserable rented rooms. Its industrial significance has been lost. There is no longer need to spin there or to preserve foods there against a coming winter. The girls, who once were home-trained, have escaped from the house-mother's tutelage; and that house-mother with her troubled brood of changelings has become the very figure of modern tragedy. The boys too are no longer taught by their fathers in field and work-shop. They have gone out into the school and the factory. Is it any wonder there is talk that reveals a desperate search for remedies? And is it any wonder that nostrum-purveyors and quack miracle-workers, who promise quick and ready relief, find followers in millions?

But then, too, think of the problems that have been created in the minor group relationships by the shifting basis of modern life. Think of the problems that have been thrust wholesale upon an unready educational system. Once a father saw to it that his son grew up to be a good citizen; but who is there to see to it in the new society? The answer is: nobody, unless the teachers of the schools accept the responsibility. And who is there to see that the child who once learned the use of his creative faculties by the side of his father finds

them and the opportunity for their use in the changed world of to-day? And this again, we see, is the terrific responsibility of the teacher. The coming of industrialism, the decline of the home, the rise of the school, is the sequence here. But teachers are perplexed as fathers and mothers never were, for the new school must give the child a freedom that is hard to attain in a factory-city environment but that was a natural feature of rural America; and it must prepare children for life in cities and in factories. And the factory cannot be brought into the school-room or school-rooms taken into factories as they once were taken into fields and workshops. The educator must simulate actual conditions whereas once boys learned to plough real fields and girls learned to make real frocks and to cook real pies.

Not far down in the scale of problems rated as important in the common talk of men and women would appear the problem of the acquiring and the consuming of the instruments they live by. There are many new strains and pressures here. In the first place choice has become excrutiatingly complex and created problems of its own by the very richness of modern alternatives. Wrong choices are easily made when temptation is so deliberate as it has been made lately; but the reaction from them is just as violent. Then there is the problem of having to express non-existent political opinions; the problem of what is to be done for amusement when one is tired from factory work and perhaps, the odorous intimacy of a swarming apartment; and the problem, ever recurrent, of looking ahead and planning against the awful periods when workers' incomes cease, as they must sooner or later under our intermittently active system of industry.

Consider also the problem of the artist in the modern world, for occasionally the Smiths and Browns and Joneses produce an individual who belongs in that rare and precious group. Under industrialism, art, with strange inconsequence, has become hopelessly separated from life. To become a sculptor or a painter one must turn his eyes backward toward mediaevalism; he must take as his models masterpieces worked out in a vanished world with materials he cannot now command. Architects have the best chance, one might think, in a world that intends to build itself all over again. But even they have not yet got round to a real willingness to work in a new mode with new materials—concrete and steel—and to do their creating with tools of design instead of on the job.[1] The architecture of

[1] Cf. Claude Bragdon, *Architecture and Democracy.*

the mediaeval cathedral still tinctures much of the sky-line of Manhattan. And Manhattan's interiors are abortively Watteauesque. This is impious anarchronism. For all artists there is a new milieu gestating deep down within the soil of industrialism; but the traditional quality of art has so far prevented, except in unusual cases, their complete absorption in the new materials and modes. Artists have not yet grasped the notion that Raphael and Michael Angelo and da Vinci lived in a different world from the one that we inhabit and that the great artists of the Renaissance would have been overjoyed with the potentialities of riveted steel and poured concrete. And so the Renaissance of the industrial age has not yet arrived and the lingering influence of Italy and France lies like a dead hand upon the institutional embodiments of twentieth century America. But this is no more true of architecture than of the other arts. Painters, for instance, have quite failed to find, with only a few notable exceptions such as Jonas Lie and George Bellows, material for their brushes in industrialism. One may search the Metropolitan Museum in vain for any suggestion that we live in a machine age. Jonas Lie's painting of the excavating machines at work on the Panama Canal is I believe the single exception.

The same is true of the writers that we hold dear in our day. The attempt here too is to escape into an ideal world, preferably a world which plays up the happy features of the past, and neglects its less fortunate aspects. Joseph Conrad cannot write of the sea without thinking in terms of sailing ships; and Messrs. Chesterton and Belloc are frankly out for the return of mediaevalism. In America we consume hundreds of thousands of volumes every year of idealized "adventure-stuff"; and the poets who find themselves at home in a real world are to be numbered on one's hands.[1] Robert Frost, Edward Arlington Robinson and Carl Sandburg among the poets; Theodore Dreiser, Floyd Dell, and Booth Tarkington among the novelists. But Edgar Lee Masters, Sinclair Lewis and Sherwood Anderson, all first rate artists, profess to see in American material only the stupidity and grossness of a human nature that is really but temporarily racked by the shifting basis of life and the uglinesses and the frustrations of a half-developed industrialism. They utterly fail to select from among the phenomena of the present, those that can and ought to bear a future when men might be free and life a kind of an adventure in beauty. And yet they all, expressly or

[1] Cf. the author's "The Gipsy Strain," *Pac. Rev.* Sept., 1921.

tacitly, recognize the fact that industry is the force that has shaped the present and that will create the future.[1] As for the religion that, in one way or another, has played so great a part in the history of mankind—even greater havoc is here. For the religion that became at first a social ethic through the work of Christ, still bears the dialectic impress of the early theologians, the Saints, Paul, Peter, Augustine and Thomas Aquinas; and mediaeval ethics in an age of industrialism must fail in the attempt to shape the conduct of men who are actually working with modern forces. The irrelevance is too constantly apparent. The situations posed have become unreal, the dilemmas have become unimportant, and the proposed solutions help us not at all in the way of life into which we are forced by the conditions of our time.

No purpose can be served by going at greater length into a general discussion of these modern problems. I have simply wanted to reëmphasize what is really an axiom of latter-day thought, but which is still neglected in favor of older premises, that, whatever the problem in whatever field of modern endeavor, the explanation of it centers in and the solution for it must be found in the fundamentally dynamic forces of our age; and that it is industry that has furnished this dynamic force in the past two centuries. The other institutions and customary arrangements and adjustments have been thrown off balance by the more rapidly changing forces and institutions that organize the means of living. The observations that have been made about the life of common folk and its unsatisfactory quality would be true of any industrialized area of the world but they are especially true of America, where, so to speak, industry had a clean start and

[1] Cf. John Dewey, *Reconstruction in Philosophy*, 212: "Poetry, art, religion are precious things. They cannot be maintained by lingering in the past and futilely wishing to restore what the movement of events in science, industry and politics has destroyed. They are an out-flowering of thought and desires that unconsciously converge into a disposition of imagination as a result of thousands and thousands of daily episodes and contacts. They cannot be willed into existence or coerced into being. The wind of the spirit bloweth where it listeth and the kingdom of God in such things does not come with observation. But while it is impossible to retain and recover by deliberate volition old sources of religion and art that have been discredited, it is possible to expedite the development of the vital sources of a religion and art that are yet to be. Not indeed by action directly aimed at their production, but by substituting faith in the active tendencies of the day for dread and dislike of them, and by the courage of intelligence to follow whither social and scientific changes direct us. We are weak today in ideal matters because intelligence is divorced from aspiration."

a good chance to create a complete culture. Certainly any standards of ethics, any ideals of progress, had to be imported if they were not to be created all over new. And certainly here in America numerous great advantages over Europe made it inevitable that European doctrine should be particularly useless for our purposes. We had wide spaces, vast stretches of fertile land, great stores of unexploited resources—metals, forests, power, food—and it was inevitable that we should have a romantic and rapid growth, a beginning in frontier life and a gradual accretion of more permanent elements with a lingering relic of frontier individualism. These forces created for us a national individuality uniquely our own. There is an American tradition even if there has been a formidable effort to force our philosophy into the older molds of European thought. We could be more generous with ourselves; we had no need to be thrifty; we had no need of a repressive morality; we had no ground in which Italian art could be naturalized or mediaeval ethics applied. And the earnest attempt to transplant all these, well-meaning as it may have been, has had results that are unmitigatedly bad: we are without adequate morals, without much art and with too much thrift and repression. Transplanting proved to be bad for the transplanted ideas; but also it proved to be bad for anyone who tried to see in them an explanation of the forces of the new world or a sufficient guide for conduct in the new age.

Economic forces have worked themselves out as they were bound to do. But our growing cities have found themselves ugly, wicked and quite without elements of strength and promise for the future according to the standards of those whose ideas, got in the school-room from teachers trained in the traditions of European culture, have been the formative ideas of the most intellectual class of the coming generations. Finally the fallacy in this was bound to have its results; and they have already come. One group, which is willing to begin all over, has been sufficiently independent of school-room thought to organize a philosophy about the constructive forces in America. Some notable modern figures among these are William James, John Dewey and Simon Nelson Patten. But a far larger group, being mainly interested in books and in a literary tradition that is altogether English has constantly tried to force the new life into the old patterns. Eventually, in every case, the alternative recourses of the purveyors of the old ideas have been limited to retirement into ill-tempered silence; the enduring life as best it could be endured; the construction for themselves of unreal worlds of partial reform—politi-

cal, social or economic—; the bursting out into a series of blazing Jeremiads, condemning the new world and all its works—and so we get *Main Street*, *Spoon River Anthology* and *Poor White*—; or else a sullen retirement across the water to Europe where they find themselves furnished with more of the appurtenances and ideals of life that they have been taught to look for in European books, than can be had on this side of the Atlantic.

Economics is more or less typical of the rest—that is to say, school-room economics. It grew up "beside the meager turnip fields of Europe" and finds a restless home upon the prairies of the West. The Classicists in Kansas and Nebraska are a misfit without compensation. We are just beginning to see that we shall really have to begin all over, forming our science upon relevant facts in American life. European generalizations of the middle of the last century—which are the typical content of our "introductory" courses in Economics in the colleges—are bound to bring to young men a sense of unreality and eventually to cause something like a frustration-revolt. Economics incontestably has got a bad metaphysical odor that only a renaissance of rebuilding from the ground up can dissipate. But until school-room economics becomes a body of relevant principles, until economists undertake the appeal to experiment for the demonstration of their generalizations as truth, other problems—problems of the home, the church, the school—will have to wait for solutions. For the nature of all American problems is so permeated with industrial implications that there is no other way to begin. This obligation of the economists is a pressing one. Younger men, many of them, see the light and are making for it; but the path is beset with trouble, just as the path of the modern artist is beset with trouble whose only source of training is Rome or Paris. Never has the world been more obviously in need of expert leadership and never has the obligation of leadership more obviously devolved upon a single group. It is the clear duty of American economists to say what the economic system of America can and should do and to point the true path toward new goals.

3. THE ASSURANCE OF RIGHTNESS IN SCIENCE

The story of Sir Isaac Newton that we heard as children was not just another fairy tale of the same sort as "Snow Queen" or "Cinderella," for, unlike them, it hid a truth that is still truth: it pictured a triumph of reason rather than of goodness, of a seeking after achievement rather than interludes of peace. Whether it has a basis

in fact or not doesn't matter so much as that we feel the larger fact of illustrated truth behind it.[1]

It is easy for us to picture Sir Isaac reclining on the grass beneath the apple tree of tradition, his senses swimming in that half-dozing, half-waking state that seems to liberate the consciousness from its caged and customary habit and to heighten the acuteness of the mind's receptors to the significant occurrences that go on about it always, and always fail to register; and very nearly we can see his freed intelligence groping toward the truth it needed, coming nearer and nearer to the quarry until, all at once, there it lay, encircled, captured, tamed! We can follow even further. We can see his agitation as his consciousness awoke to the significance of his mind's discovery and as, still motionless, he regarded the completed work of fancy. We can see him fumbling for the firm grasp upon his vision; we can see him in the days and weeks that follow, sleepless and sallow, trying for the technique of verification, and meanwhile protecting his discovery from the jibes of the sceptical, guarding his capture as one might cup a candle's flame within curving hands. We can see him carrying the delicate thing into the laboratory, trusting it there to paper as the certainty of understanding grew. And at last we can believe that there came a choking surge of emotion as he realized to the full that this was truth. He had miraculously—no less—got hold of a piece of truth, that elusive, fragile, tormenting stuff that haunts the nights and fills the days of its devotees, that bodies itself in visions and that breathes with a strange new life in laboratories. This is the authentic modern experience of the Galatea, for the scientist can show his world results. He can prove. He can do it all over again, recreating the conditions that substantiate it. Given the dream, which is miracle, the demonstration of reality can be repeated at will; and so the creator can be sure of rightness; he need fear no ridicule, for ultimate vindication is certain. But even more important to him, he can be sure that he has contributed to the magnificent coöperative task of damming back the circling walls of bulging opaqueness—walls that hide strange and diabolic terrors—that surround man standing in his little circle of light. We should like to

[1] Cf. Sir David Brewster, *Memoirs of the Life, Writings and Discoveries of Sir Isaac Newton*, Constable, (Edinburgh), 1855; Augustus De Morgan, *Essays on the Life and Work of Newton;* and Sedgwick and Tyler, *A Short History of Science*, 290ff. The story of the apple has an interesting history of its own. Voltaire preserved it, having had it related to him by Mrs. Conduit, Newton's niece; cf. Tallentyre, *Life of Voltaire*, 53.

think, at least—and why may we not?—that Sir Isaac had this experience of the grandest emotion man may have, for it is the grandest, since by it man creates what our poor language calls, with characteristic under-emphasis, *progress.*

An even more striking illustration of the assurance of rightness there can be in the natural sciences is furnished by the tale that is told of Galileo, Newton's predecessor and the friend of Tycho Brahe and Kepler.[1] It was he who scandalized the scholastic world by his public experiment in physics when he dropped bullets of unequal weights from the leaning Pisan tower and so demonstrated the truth he had come by, that unequal weights approach the earth at identical speeds. Since Aristotle had said otherwise and many scholars in their studies had proved to the satisfaction of almost everyone that this could not be so, there was great and natural rage.[2] The climax of Galileo's heresy was reached, however, when, developing the ideas of Copernicus and Kepler, he made certain observations concerning the position of the earth in the universe; and the story tells how, when he was forced to recant upon his knees before the inquisitional tribunal of Cardinals, he rose to his feet, muttering under his breath: "It is, nevertheless, true!" He could be certain. In the face of tyrannical opinion and received authority, he *knew.*

It is sometimes more, sometimes less, difficult to isolate and to demonstrate by experiment the bits of truth that scientists discover; but nothing is accepted as that truth unless it can be so demonstrated. This has always been recognized by scientists; they are jealous of their truths until they can be sure by experiment and verification.[3] After that nothing much matters. Inquisitions in the old or the modern style may persecute, they may even force insincere public recantations, but they cannot destroy the truth, for that is imperishable; and they cannot destroy the scientists' assurance, for that is fixed not by opinion but by fact.

Society has become complicated to the point where social scientists are needed and have appeared. They are inclined to think of themselves as in the direct line of descent from the natural scientists of

[1] It has no authenticity, of course, except the authenticity of its persistent currency.

[2] See Sedgwick and Tyler's short account of the life and work of Galileo, *ibid.*, 217ff. See also Galileo before the Inquisition, 414ff.

[3] R. B. Perry, *"The Present Conflict of Ideals,* 46: "The scientist . . . proceeds upon the supposition that his work will be useful only provided he reserves the application until after he has made the discovery . . . Nature obeys only those who serve her; who have patience and restraint enough to learn her ways."

the past—the tradition that included Archimedes, Euclid, Hipparchus, Lucretius, Roger Bacon, da Vinci, Mercator, Tycho Brahe, Galileo, Kepler, Harvey, Decartes, Leibnitz, Newton, Linnaeus, Haller, Priestley, Lamarck, Lavoisier, Laplace, Watt, Lister, Pasteur, Mendel, Weissmann, Darwin and Wallace. But there is a difference that always has to be remembered: the distinctions between pure and applied science are very much easier to discern in the natural sciences than in the social sciences. The problems of social science are much more immediately the problems of human life; and any injection of humanity into the problem situation seems almost invariably to bring the application of the proposed solution into the light at once and with all its consequences for conduct well to the fore. This is very apt to make for confusion. The natural scientists have usually been able to postpone the application of their conclusions until some experimental work has demonstrated its worth. This is partly because many of the conclusions of natural science *seem* not to affect social arrangements, and partly because of the ease of simulating natural conditions in laboratories. But the conclusions of social science have had to meet the test of application in a complex, going system immediately. There never has been any sheltering of ideas in cupped hands; there has been no carrying into laboratories for experiment.

It is a modern axiom that the truth must be useful; and if science does not help to solve a problem it cannot reach out toward truth. In fact, the problem probably never would be attacked seriously if it did not involve a useful answer, since it is another modern axiom that thought is engendered and visions attracted only by intellectual quandaries. It follows, of course, that thought reaches out toward this useful truth [1] and that systems of science are organized for this reaching out. But it is one thing to have a vision of a truth and quite another to have one's vision, untried by experiment, put to the fateful trial and error test and thus thrown into the arena of heated discussion—as it almost certainly will be if it involves changes that immediately affect humanity. There are no Pisan towers as yet in social science; but they must be acquired so that we may *know* as Galileo knew, in the face of denial and bitter recrimination, that we are right. Social science must try to isolate its problems and to devise and use special tools for dispassionate verification.

The danger lies in the deep and persistent emotional attitudes that are engaged when an attack is made on any of the problems of in-

[1] John Dewey, *How We Think.*

dustrial life. This is at once cause and effect. Because our very being so fundamentally depends upon our socialized mechanism for the provision of subsistence, and because the mechanism has become so specialized and intricate, we must have answers to economic problems and we must at the same time expect the sharpest conflict of emotionalized opinion concerning these proposed answers. But there was only one way of severing the Gordian knot; and here there is only one way of moving toward factual bases and dependable attitudes: the problems must be studied and the emotions must be escaped. The candle must be held in cupped hands until its flame is sure and strong.

4. ECONOMICS AND NATURAL LAW

In 1492—that so notable year to Americans—Greek began to be taught at Oxford, supplementing Latin. And of course Greek meant Plato—the Plato of *The Republic*. This was the beginning of a renaissance of learning in England that has borne much fruit. It was not long until scholars who had theretofore gone on intellectual pilgrimages to Florence in northern Italy to hear the lectures of Chalcondylas, began to find at Oxford in the lectures of Grocyn and Colet a fountain of the new enlightenment as clear and limpid as that at Florence. The immortal Erasmus had his training here; and it was less than a generation before the new thought found its first permanent embodiment in Sir Thomas More's *Utopia*. It was a movement that, once started, could never have an end because its source was in the deep wells of social experience. As well try to abolish the waves of the sea or to limit their force as to oppose the movement toward the light of man's liberated intelligence. It may, of course, be argued that Platonism is not essentially scientific; but the liberated intelligence of Plato's followers in Greece turned naturally to science and likewise in England Platonism turned scientific.

Though there is a long history of development intervening, and though the men of the renaissance encountered bitter opposition from ecclesiastical and political authority, the sequence now appears direct to Newton, to Lyell, to Priestly, and to Darwin. What in the sixteenth century was but a beginning, by the eighteenth century had become so nearly universal among the intellectual classes, had won so many important adherents, and had gained so much by the accretions of scientific generalization in every generation, that the student of eighteenth century thought feels himself constantly in the atmosphere of a genuine scientific philosophy even though it may seem not to have attained completely its experimental transfiguration.

It was the endeavor of the scientists always to establish generalizations that should have the force of law; and natural law, derived from the natural sciences, was the common diet of the century. Moreover whatever was "natural" was judged to be good because it was natural.[1] And this led to the quaint thought that whatever knowledge fell within the purview of scientific generalization, must, because it was natural be also good.[2]

This too was a curious twist that one might not expect from a revival of Platonic learning, but it must be remembered that though experimentalism was the method of science in the seventeenth and eighteenth centuries, there was still a great dearth of the factual knowledge of the material world which we now have; and scientists still naïvely hoped to establish very soon a universal and all-comprehensive science.[3]

One took it for granted that all phenomena and all circumstances of all occurrences referred themselves to the laws that were known to natural science. And it was into this world that political economy was born and in this atmosphere that it was reared.[4]

[1] For an account of scientific advance in the century, Sedgwick and Tyler, *op. cit.*, ch. XIV.

[2] Cf. Gide and Rist, *History of Economic Doctrines*, 68: "In the eighteenth century anything natural or spontaneous was immediately voted good, and the terms 'natural,' 'just,' and 'advantageous' were often used as synonymous."

[3] Cf. Marvin, *The History of European Philosophy*, 315: "Though experimental inquiry became rapidly in the seventeenth and eighteenth centuries the tradition of European physical science and spread rapidly from one field of study to another, we must hasten to add that this was but the beginning and not the end of a mighty movement in science and that most European thinkers still held to a radically different philosophy and method. Moreover, in those days, most thoughtful men believed the goal of universal and infallible knowledge to be not far distant; and though they fought Aristotelianism they were themselves still Aristotelian. Hence under the spell of a growing and triumphant mathematics and mathematical dynamics they hoped soon to give the world a deductive, universal and infallible science."

[4] Sedgwick and Tyler, *op. cit.*, 322: "The physiocrats and the encyclopaedists of the French school of practical philosophers . . . were professedly inspired by science and seeking to apply it to human society." The adherence of Adam Smith to naturalism has been called to the attention of students many times, notably by Gide and Rist, *loc. cit.* An illustration of this orientation in working out a practical problem may be found in Book I of *The Wealth of Nations* (p. 57 of the Cannan edition). He is there discussing the price of commodities and he says: "When the price of a commodity is neither more nor less than what is sufficient to pay the rent of the land, the wages of the labour, and the profits of the stock employed in raising, preparing and bringing to market, according to their *natural* rates, the commodity is then sold for what may be

In the hands of Smith, Malthus, and the Mills, primarily moral philosophers, all of them, the infusion of natural law into economics went on until the completed body of classical doctrine stood, full grown and rigidly symmetrical, fashioned according to law; and so, not only the only possible conclusions had been drawn concerning economic laws, but also these conclusions had the ethical quality of goodness and a permanence that designated any human attempt to modify them as futile and even somewhat wicked.[1]

One of the difficulties here, that seems plain now, was that seventeenth and eighteenth century natural law was physical law and grew up in the fields most remote from human contact; and that economic behavior was a kind of human behavior with subtleties of motivation and reaction that escaped the crude methods of observation of the time. It was logically assumed and, of course, correctly enough, that men's economic actions must have somehow traceable causes but it was a mistake for the economists to assume that they could, by excogitation, dig the laws of motives and reactions out of their own minds, even though they were moral philosophers. And so they only managed to create the structure of classical theory by doing a good deal of violence to what were then hidden actualities. Their premises were set apart, secure—so secure as hardly even to be explicit.[2] This is one sufficient reason why their economic theory cannot help us to understand the problems of human economic behavior any more. If they had an economic world which was only

called its *natural* price . . . The commodity is then sold for precisely *what it is worth*. . . ." (Italics are the author's.)

[1] As to Smith, Gide and Rist, *op. cit.*, 99, say: "Smith did not escape the confusion of ideas. Having shown the natural origin of economic institutions, he imagined that at the same time he had demonstrated their useful and beneficent character." The same observation would be true of Malthus, Ricardo, Marx, the elder Mill and John Stuart Mill, although the latter in later life came to see the fallacy and in the essays of his later years seems to have abandoned the position. A candid examination of all the literary remains of J. S. Mill will show, I think, a curious dualism in this matter. He was formally a believer in natural law but constantly in rebellion against it, though his rebellion was emotional and he was afraid to trust it. His intellectual development in this respect can be traced in the *Autobiography*. Natural law permeated the *Principles;* his departures were exceptions; but the largest body of material in the *Principles* is made up of these exceptions. The best discussion of this matter known to the writer is still unprinted in E. E. Neff's *Mill and Carlyle—A Study in Opposing Temperaments.*

[2] Cf. S. N. Patten, "Pragmatism and Social Science" in *Essays in Economic Theory*, 259: "It is the emphasis on premises instead of consequences that has divided the old moral philosophy into so many parts."

roughly like ours—our world in embryo, so to speak—they also knew but little about the human motives which had to find expression in that world.[1]

One of their grandest assumptions was that there were immutable laws continuously governing social development. This had its completest formulation, perhaps, in Spencer, but it is implicit in the whole body of nineteenth century social thought. A curious feature about this, as we look at it now, is that it leaves man's intelligence wholly out of account as affecting the basic laws of development. This resulted from the transfer of natural laws to social science. The truth of the matter seems to us now to be that man can change society in very nearly any respect he cares to; he has only to will it persistently and strongly enough, to formulate his ideals distinctly enough, to go slow enough, and to keep close enough to present determinants in transforming his environment into the ideal.

Those nineteenth century economists who formulated the so-called dismal laws of economics,[2] neglected the one obvious fact that "gives away the whole show." Man need not press upon his food supply if he wills not to and so can genuinely raise the levels of living; diminishing returns will never set in so long as man continues to exercise his intelligence. These economic generalizations turn out not to be natural laws at all but merely a statement of the conditions of life in an undeveloped society. As time goes on the fallacy of assuming the universal validity of *economic law* becomes more and more plain; and especially when the concept *economic law* is taken to mean some inescapable trend of development. The most useful result of eighteenth and nineteenth century economic thinking seems to us now to have been the formulation of "laws" which men immediately set to work to circumvent—and did! One only has to consider Malthusianism for an illustration.[3]

The same flaw exists in the reasoning of classical economists in nearly every department of their thought. Value theory is a good illustration of this because the theory is so complicated and yet so

[1] Cf. the writer's "Human Nature in Economic Theory," *Jour. Pol. Econ.*, xxx, 317-45, June 1922.

[2] That there was a natural price which was also a just price, that man would always press upon his food supply, that diminishing returns had always to be looked out for, that wages could never rise above the level of bare subsistence, that wages depended upon the fund of capital available—and the like.

[3] "Malthusianism" is here used in its ordinary but incorrect sense. Malthus, in the writer's opinion would never have subscribed to the tenets of the later schools who interpreted him according to their preconceptions.

complete. It represents a genuine and successful attempt to build up a comprehensive generalization to cover a whole group of apparently unrelated phenomena. It was not carried to perfection by the classical school, but the early classicists marked out the way which was to be pursued by the English mathematical school, the Austrian psychological school and finally to be rounded into its perfect form by Alfred Marshall and certain Americans.[1] In this completed theory, value is thought of as being fixed by complex supply and demand forces working to an equilibrium fixed by marginal increments withheld or released. The difficulty comes when we transfer this concept, which is really an explanation of social processes,[2] into the same form of statement that is used in stating a natural law. In fact no enlightened society will tolerate the free working out of such forces. Values have human consequences that are too great. And we already have a vast organized politico-social machinery for seeing that they do not work out in the way that is described by the economists as though it were inevitable and benevolent.[3] When it becomes clear that human welfare is jeopardized by the working of any economic law, human intelligence has a way of going to work with entire disregard for threatened consequences and contriving some alternative scheme of operation that will work better for the purpose. The Malthusian law has been mentioned. But there are others. The iron law of wages stretches with the elasticity of rubber and the subsistence level of living rises to what workers a century or two ago would have thought of as a luxury level; the law of diminishing returns, in the light of historical development, might better have been called increasing returns. At least these were not natural laws and the discovery that they were not has come about through the unwillingness of men to accept their dire consequences as the only possible answer to the problems posed by the attempt to better the conditions of life.

It may of course be said that the law of gravity has only been circumvented by the science of aëronautics and that the law is a controlling force just the same; and it may also be said that the law of diminishing returns has only been temporarily circumvented by invention, discovery and substitution and that the law is always there

[1] Notably F. A. Walker, F. H. Taussig, R. T. Ely, J. B. Clark and E. R. A. Seligman, though there were, and still are, Americans who are still engaged in clearing up the fine points of classical theory. Among these of the younger men are F. H. Knight and R. T. Bye.

[2] Its validity as analysis and explanation depends also upon the power, which is often questioned, of static picturing to portray dynamic processes.

[3] Cf. the writer's *Economic Basis of Public Interest*, 1922.

in the background just the same. But if you do say this you will have delivered yourself into the hands of a sceptically inclined younger generation because they can at once point out that you have displayed the great weakness of your false analogy between social law and natural law. Physicists are not so sure any more since the cumulative proof of Professor Einstein's theory of relativity has begun to come in but that the law of gravity is rapidly outliving its usefulness as a generalization upon which to premise further scientific research; but social scientists can be pretty sure that the law of diminishing returns has outlived any similar usefulness it once may have had in economics. The law of gravitation has in fact been useful in innumerable experiments that have established some truth or uniformity. But you can never point out that the law of diminishing returns has been useful in the same sense. Nor can you successfully contend that the laws of marginal value have ever helped to establish any further useful generalizations. Pointing to distribution will not help your case for modern problems have demanded a merging of separate funds and a thinking of surplus as one fund which is diffused not by natural law but by the pull and haul of present power among the various interests involved.[1]

Economic laws are not natural laws just because they are not useful in the sense that natural laws are useful. They became, in the hands of the classical school, ends in themselves. They probably tended strongly toward the justification of some order or condition of affairs that the particular economist wanted to justify, but often, as it now seems, they were merely logical exercises.

So it was that classical theory as it received its last touches at the hands of Alfred Marshall and the Americans stood triumphantly symmetrical, an absolute! And so it is still too much taught. By a series of assumptions and with the use of certain chosen illustrations it can be worked up to climactically—and has been by thousands and thousands of teachers. And when the thing is complete—there you are! Value! But someway or other the student goes away from the demonstration unsatisfied, frustrated, angry, feeling rather as though a logical trick had been played upon him. And why? Well, because, for one thing, in this twentieth century, the truth must be useful. And this is not.

It is from this dialectical dilettanteism, this metaphysical unreality, that economics as a class-room discipline needs to be res-

1 Cf. Patten, "The Reconstruction of Economic Theory," in *Essays in Economic Theory*, 273, at 303.

cued, and not only as a class-room discipline, but also so that the so-called "practical" economist need not feel himself an intellectual alien but may know himself for one who is working out the material for a science of reality in the places where it must be worked out—in factory, field and office.

5. THE EXPERIMENTAL ATTITUDE

If the intellectual atmosphere of the eighteenth century was instinct with Newtonian natural law, it is equally true that the intellectual atmosphere of the twentieth century is instinct with what might be called the experimental attitude. This attitude has always been implicit—or even, sometimes, explicit—in the philosophies of certain thinkers as far back as history goes, but these men have never represented the dominant thought of their time and they have usually had to face a good deal of persecution of one kind or another because of their unwillingness to accept received authority at its face value. But now the situation is different. Several influences have been at work. Natural law has lost its force in analogous application because so many times events have disproved its premises. There has been a drift toward the substitution of consequences for premises in the search for truth in all fields. Workers in each department of knowledge have been driven to seek their own tests and methods. Then too the specialization of scientific processes has made it inevitable that the conclusions of each science should become more and more crudite and difficult of understanding without the long and particular training which only specialists have. For this reason too the use of natural law and borrowed premises has had to be given up.

No one any more can hope to understand the whole of science as was very definitely hoped by the scientists a century or two ago; and so modern scientists gradually have abandoned the hope of a great, inclusive integration in favor of frankly specialized work in particular fields. This is generally true also of social science. One reason why economists of the younger generation depend much less on natural law than their predecessors is that there is uncertainty in every scientist's mind as to the conclusions of other sciences, and usually, indeed, of his own. Nothing can be taken as ultimate any more. And there are no ultimates, therefore, to form premises for economics either within the economic field or outside of it. But the greatest change has been just in the revised attitude toward ultimates. We have ceased to look for ultimates and turned to the search for expedients.

The reasons for the growth of experimentalism cannot be assessed

with anything like exactness; but one reason at least for it certainly has been the failure of deduction from excogitated premises to produce results that count for the attainment of the goals society more or less unconsciously sets for itself. In economics this goal is broadly defined as *welfare,* meaning by welfare the Benthamistic formula: the greatest good to the greatest number. It is surprising what agreement there is among all classes of social scientists about this very general aim.[1] Disagreements almost uniformly concern the method of arriving at the goal. Another reason has been the great development and improvement in scientific method and procedure. This has even led to a redefinition of science in a much different way than it would have been defined in another century. Professor Perry, for instance, brings into his definition the word "systematic" and the term "consensus of experts."[2]

The whole conception of science, then—and the modern world has gone over to science—*is* experimentalism. Scientists have learned to distrust premises and to depend upon consequences. And in social science this is bound to involve social facts as they are to be observed in a going society. These facts are the consequences. Theory must have reference to them if it is to be useful.

All unconsciously economics has breathed in the new air. The justification for the use of the term "unconsciously," here is that the new economic studies hardly have been recognized as economics at all. Economics is too much thought of still as a purely academic discipline and so has continued its relations with old premises and with traditionalism and authority. The workers in factory, field and office and the academic workers who have associated themselves with the going system in various ways, have not been thought of as carrying on activities that have any real reference to the body of eco-

[1] An aim involves the search for expedients; a premise excludes it. The word *aim* used here ought not to be confused with *premise,* as it sometimes is.

[2] *The Present Conflict of Ideals,* 45: "When I speak of science I mean something rather definite. I do not mean merely knowledge in general; I mean *methodical knowledge,* that coöperative, systematic pursuit of knowledge which employs an established technique, and leads to a consensus of experts. . . . Science is empirical or experimental. It accepts sense-experience as the final test. Though it uses reason and imagination in the forming of hypotheses, it regards these as on trial until the verdict of sense-experience can be obtained. Scientific method is opposed to speculation which carries belief beyond the effective range of the cognitive faculties; to rationalism, which claims to find logical inference a warrant for exceeding or ignoring the evidence of sense; and to dogmatism, which allows non-theoretical motives, such as inclination, habit or authority to determine belief."

nomic principles that our generation has inherited,[1] and their places of work have not been thought of as the field in which the theories of the economists must be tested for truth or falsity. An academic discipline is apt to depend upon premises and to carry on in a traditional way. It becomes refined and separated from the other fields of human knowledge; and it builds up a separate body of principles that is added to by successive increments until it becomes a closed system of assumptions, logical developments and generalizations, rounded and whole. The increments that are added are really *additions,* not *changes;* and so the assumptions remain unchanged in a changing world. Students are introduced to this body of principles and led, step by step, from the premises, which they are too timid or too careless to question, through the logical steps to the ends foreseen by their instructors from the beginning. So they come to think of economics as something quite other than the science that explains the workaday life of men. And this is really what the world knows and what university students know—as "economics." But there have been protestants both conscious and unconscious. There was Toynbee, for instance, who might have called a halt had he not died so young, and there were others even in the nineteenth century. Also there is a vigorous modern development that seems to have great promise. I refer of course to the group of American economists who are working in their own schools of commerce, finance and industry.

There are some minds that, more than others, are of the questing sort, restless, imaginative, intuitive, that have seen the significance for modern life of the factory, have seen that the main condition of

[1] It is true that industrial activity has always been thought of as economic activity but it has been true too that it has been felt among economists that industry was being rather impertinent when it failed to come to the conclusions in actual operation which economic principles indicated it ought to come to. (Cf. W. H. Hamilton, "Vestigial Economics," *New Republic,* Apr. 4, 1923. A review of Henderson's *Supply and Demand*). In other words the principles came first rather than the practice. This reversal of the experimental order of procedure was just what might have been calculated to bring about a quick and complete mutual irrelevance between principle and practice. The experimentalists in economics have been rather frowned upon by those versed deeply in old theory; for one thing, because they were working in fields more or less unknown to the old theory, or at least fields that were so minor as hardly to be noticed in any text of *Principles;* and for another thing, because they have tended to remain more or less unaware of old theory and of its real value and so have seemed ignorant in an important respect to those who were versed in it. Mutual antagonism, sometimes serious, has resulted—serious because it led to closer adherence to old theory on the one hand and to a defiant repudiation of theory as impractical on the other.

modern living is—and is bound to be—industrial. And many of these seeking minds have turned to the realer fields of economics; and not as the acquisitive turn but with the spirit that moves the pure scientist. The impulse is strong in them to manipulate the forces of industry, to isolate them for study, to turn them over and about in their hands, to put them together in new ways—and to see how they operate actually. It is so that science has come into industry—not the pseudo-science that serves acquisitive purpose (though this by chance may have the same result, but only by chance)—but the science that serves no man's purpose unless it is the same one actuating the biologist, who, in his laboratory, manipulates his germs and bacteria. It is enough to call this the scientific impulse and to know that it finds expression through what is generally known as scientific method. Professor Perry describes that scientific method in fine phrasing: "Scientific method has come . . . to signify a respect for *facts,* in the sense of that which is independent of all human wishes. It has come to signify a conforming of judgment to things as they are, regardless of likes or dislikes, hopes or fears. Science represents the specialization of the theoretical interest, which for the time being ignores every consideration but the evidence."[1]

Or, even better, Santayana's definition might be used. It calls attention to less obvious elements, the intuitional elements, but nevertheless insists upon the experimental background as an integral part of the method: "Science, then, is the attentive consideration of common experience; it is common knowledge extended and refined. Its validity is of the same order as that of ordinary perception, memory and understanding. Its test is found, like others, in actual intuition, which sometimes consists in perception and sometimes in intent. The flight of science is no longer from perception to perception, and its deduction more accurate of meaning from meaning and purpose from purpose. It generates in the mind, for each vulgar observation, a whole brood of suggestions, hypotheses and inferences. The sciences bestow, as is right and fitting, infinite pains upon that experience which in their absence would drift by unchallenged or misunderstood. They take note, infer and prophesy. They compare prophecy with event; and altogether they supply—so intent are they on reality—every imaginable background and extension for the present dream." How different a thing this is from the academic discipline our youths—in thousands and thousands every year—are introduced to as "the science of economics." Our school-room eco-

[1] *The Present Conflict of Ideals,* 46.

nomics, is, in fact, for the most part a travesty on the introduction to science, its true nature disguised a very little by the fact that it calls itself by the name of "science."

This new impulse has had a number of important issues, even if the discipline of the colleges has not yet found it out. And they are the hope of the future in so far as the future is to be an industrial one. One of these issues is the school of industry; mentioned above, which has grown gradually in the last thirty years into University curricula everywhere.[1] In these schools there is an intensive study of the functioning institutions, and the operating forces of industrialism. Transportation, Insurance, Industrial Geography, Business Statistics, Finance, Accounting, Merchandising, Shop-management, Personelle Selection and the like are made disciplines in their own right as scientific research establishes the particular uniformities of each branch of learning. There is no pecuniary advantage in this research any more than there is in any other scientific or academic pursuit, and it is important that this should be so, for what is wanted is not research in the interest of any profit-getting group, or with a predilection of tenderness for any commercial interest, or the buried preconceptions that any commercial relation engenders, but the work of men who do not care what happens to any thing or any person—any more than the biological chemist cares—except that industry shall fit better the large needs of mankind and serve civilization with smoother-running machinery, and with better adjusted human arrangements.[2]

This is industrial science. Economics thus becomes a science. But

[1] Of these the first was the Wharton School of the University of Pennsylvania as it is still the prototype.

[2] There is one threat to this disinterestedness that ought to be mentioned here. Industrial concerns are rapidly discovering the value to themselves of the turning loose upon their particular problems of such research-ability, and they often are willing to supplement inadequate academic pay with tempting proposals for remunerating part-time assistance. They also are beginning to buy away the whole-time service of many promising experimental economists. The danger there is in this cannot be emphasized too strongly. For one who is working *for* business finds it difficult to be entirely disinterested *about* business. No one ought to take wages for experiments in industry, if he is still to think of himself as a scientist, for true scientists in such a dilemma refuse to accept any remuneration other than that which is received from their research foundation, whether it be University or private. To do so, they know, is to destroy the very spirit and life of science and to transfer a part of their allegiance from the service of the whole of mankind to the service of a part of mankind—and as industry is at present organized, very likely to the detriment of the interests of the whole. The payment of really adequate salaries by Universities and Research Foundations would assist in the maintenance of genuine scientific disinterestedness among the members of their staffs.

all of this becoming has happened almost independently. Scientific economics has grown up along side of or through the old academic discipline that usually has been called "economics." The old conception and the old principles as valuable truths find very few defenders now. And yet a survey of economics teaching will show the remarkable persistence of the thing itself in academic life. Many thousands of text books embodying it are still sold every year in every region of the earth; and it is through them that college students first come to their formal study of the basic industrial forces in the life around them. It can, of course, be due only to one cause—the inertia of traditionalism. Teachers have vested interests in those courses in metaphysical economics.[1] They were trained that way. They know how to teach that way. They know their way about in the texts. So our "vestigial economics" persists; and the new experimental science of economics grows up not in the liberal colleges but in its own schools and in research foundations. It is still sadly true that the term "economist" is applied only with the greatest reluctance to any one who has not seen his way clear to the writing of a neo-classical volume called *Principles of Economics.*

But the important thing is that the experimental movement has grown to powerful proportions, that schools of industry have multiplied and that research foundations are coming to have an important recognition as genuine scientific organizations. For after all the great need was that the spirit of science, which is the spirit of these years, that restless, questing fever in men, should have opportunity as abundant to experiment with industrial materials as it has had for many years to work with the materials of physics and chemistry. And the time has almost arrived, as a result of the movement, when it can be said that economics has really become an experimental science.

6. THE FIELDS OF ECONOMICS

Because experiment in economics has grown up without recognition in theory, its future place among the fields of economics has not yet been speculated upon very much. The separation of research workers into groups distinct from deductive workers has led to mutual antagonism in some cases, but even more importantly to mutual ignorance of the real value of each to the other. The experimental worker feels the power of the forces he works with and is apt to want to rule out deductive effort altogether as unprofitable; and the theorists on the other hand are apt to try, at least, to keep

1 Called "meta-economics" by some unknown wit.

their economics wholly deductive and metaphysical. But the result is bound to be some kind of a workable compromise; and it is best that this should be so. There ought never to be given up that approach to the problems of industry which is essentially intuitive in its fundamental quality.[1] This is that leaping deductive power that some men have to see as a whole completed arrangements that scarcely have had their beginnings formulated as science. It is this quality of mind that has issued in the great line of social utopias from Plato to Edward Bellamy [2] and also in those more immediate proposals for change that have served for the economic ideals of whole periods of history. These last are not, strictly speaking, utopias; but the habit of thought that creates utopias is the same one that enables men of vision to see through and beyond the present order of things to a new day in which the best of the present shall have become the whole of the future. Certainly, we ought not to refuse to call these essentially philosophic and ethical thinkers "economists" because they are not particularly interested in the tools and mechanisms of induction and the actual processes of verification, important as these last may be to any science. Such men propose—that is to say, they point out new and possible ways of progress. The inductive workers follow and assess the worth of their proposals. Stated in this bald way, however, a false picture of actuality is presented. As a matter of fact deduction lies at the very heart of induction. The best theorist is the man who knows best the methods—and the results in his field—of induction. This is only to say again, as Professor Dewey has said before, that the place of active and planning thought is "within the very processes of experience." [3] Also it must submit to be guided by

[1] See Knight, *Risk, Uncertainty and Profit*, 7 (note) for a good statement of the need of compromise between inductive and deductive method.

[2] Morley, *Ideal Commonwealths;* Mumford, *The Story of Utopias;* and Hertzler, *The History of Utopian Thought.*

[3] ". . . recognition of the place of active and planning thought within the very processes of experience radically alters the traditional status of the technical problems of particular and universal, sense and reason, perceptual and conceptual. But the alteration is of much more than technical significance. For reason is experimental intelligence, conceived after the pattern of science, and used in the creation of social arts; it has something to do. It liberates man from the bondage of the past, due to ignorance and accident hardened into custom. It projects a better future and assists man in its realization. And its operation is always subject to test in experience. The plans which are formed, the principles which man projects as guides of reconstructive action, are not dogmas. They are hypotheses to be worked out in practise, and to be rejected, corrected and expanded as they fail or succeed in giving our present experience the guidance it requires. We may call them programmes

experience. Deduction cannot take place with entire irrelevance to the milieu in which the intelligence of the theorist who creates it is working, but it can develop fantastic and unworkable proposals for future guidance, and these can only be detected and rejected by the interaction of these projections and the experience of their results, either in eventuation or in the alternative forecasts of other and better intelligences. In any case it is clear that deduction has a part to play and that induction also has a part to play. It is also clear, however, that the shorter the road to inductive certainty the better off we are actually and the less costly will be our social experience. If, instead of actually putting into operation proposals for social change, we can somehow simulate this experience as the chemist simulates in his laboratory, we shall have made a big advance in social method.[1]

And so we need the intuitive habit of mind. And we need the verifying habit of mind. But if they happen to get themselves inside the same head, society is doubly blessed in that particular one of its servants to whom the head happens to belong. Progress would have been very slow lacking these "guides to reconstructive action," sometimes verified by the man of vision; sometimes not. Newton was a *rara avis* in this respect; he proved his own case. And there have been others such as Darwin and Pasteur. But it has not always been so; Laplace, Lamarck, Franklin, even Priestly were not great inductive workers, yet theirs are great names in the history of science. In economics, Adam Smith was no great scholar, nor was Ricardo; Malthus was and so was Marx. But Mill was essentially deductive and so was Patten.

We are in a better position nowadays to use both habits of mind than ever any society has been before, whether they appear in the same individual, or whether they appear as contrasting abilities in different individuals. This is because inductive work can be sys-

of action, but since they are to be used in making our future acts less blind, more directed, they are flexible. Intelligence is not something possessed once for all. It is in constant process of forming, and its retention requires constant alertness in observing consequences, an openminded will to learn and courage in re-adjustment." *Reconstruction in Philosophy*, 96–7.

[1] As yet we are still in the stage of civilization where it is felt by some tradition-bound minds to be sacrilegious to question the beneficence of the operation of social forces as they happen to be in operation at present. Nothing of course could be less intelligent than this. It has the effect of relegating man's creativeness to less important tasks than that ancient one of determining how we are to get along together and to do for ourselves the things that reason requires.

tematized and reduced to forms that can be carried into the laboratory; and so can somewhat test the merit of proposals for change and can measure forces as they appear in operation in the outside world. Specialists who have none of the visionary quality of thought but who love to work with facts and figures can work at definite and useful tasks of classification, measurement and verification; and others who do not care for this sort of effort but who love to speculate can bring their deductive abilities to bear with greater and greater relevance as the methods of induction become clearer and as the results appear in more understandable form. The deductivist has something to go on; he can project his reconstructive dreams without being altogether subject to the old danger of the theorist—that he may be projecting a future that has no possibility of eventuation or that would actually not be desirable in view of its detailed nature and results. For the purposes of the theorist the work of the inductivists has two agreeable aspects: it can make some appraisal of his visions before they are tried and so give them a quality of reality they otherwise might not have; and it can quickly and certainly measure their results when they have been put into operation. If both kinds of economists could see this mutual advantage, and if they could bring their efforts into greater harmony, the cause for which each is working would be greatly furthered. And there is this conscious attempt on both sides at the present time.

A part of the reason why this rapprochement has not gone far hitherto has been the failure to visualize the departments into which economics has become divided as time has gone on; also the specialists have failed to recognize that their work is essentially different from, but nevertheless complementary to, the work others are doing. Two kinds of workers have been mentioned here—the theorist and the experimenter.[1] But besides these there are at least two others who are important: the historian and the teacher. The historian is preoccupied with the problems of reconstructing for our enlightenment the ways in which men in other ages have gone to work at the solutions of their own problems. It seems right that we should go on training men for this special type of historical effort and that they should have a recognized place among economists. It requires a very high order of ability but of a somewhat different quality than any other kind of work. It is what is ordinarily known as "research"

[1] It ought to be clearly recognized that the theorist can have an *experimental attitude* and so the right to call himself an experimental economist even though he is not actually at work with industrial induction. He accepts the test of fact; he asks for verification.

in University colloquialism. Finally there is the teacher whose business is primarily that of handing on the accumulated knowledge of our system so that his students may in time come to the brink of present problems trained and fit to plunge in and make themselves a part of the great intellectual coöperation that will bear the responsibility of creating from the present a better future.

7. THE RESEARCH WORKER AND THE THEORIST

In separating the fields of economics from one another in this way it has not been meant to suggest that the separation is always—or even often—clearly made or that there are not always men whose minds cut across several or all of them. The classification, like all classifications, seems to clarify, that is all, and to help each of us to see where we belong, as well as to define more closely our aims for each of the kinds of economic effort.

The others will be discussed too, but just here it is desired to discuss the place of induction, of laboratory and statistical work; and it ought to be said at once that its place seems to be a vital one—vital but subordinate, just as in any other science. The imaginative leap forecasts developments and makes suggestions. Following it there are the indefinitely long periods of the intensive and specialized work of checking up. And the function of this verification process is not only that of checking up, either, as it may turn out, which illustrates why it is that the imaginative, deductive thinker is doubly blessed if he is also a research worker. For the promises of the future lie deep within the intricacies, often, of the inductive work that only the thoroughly oriented person is in a position to understand. Consider, for instance, the case of Roentgen and the X-ray. It was by the merest chance that, in the course of an entirely different investigation, he happened to see that his apparatus had photographed a key through a book. A mere laboratory routinist might well have overlooked the significance of such an occurrence; and it was only a chance that an imaginative person happened to be so familiar with the doings in a laboratory. But the conjunction of these was necessary for the development of the great work we now associate with Roentgen's name. And then, of course, there is the classic illustration furnished by the history of Pasteur's work. He revolutionized the science of medicine, eventually, but not through experiments directed from the beginning toward that specific end.[1]

[1] Cf. Vallery-Radot's *Life of Pasteur*, especially the story of his work with wine-ferments that led to the microbe theory of disease: ch. v ff.

So the verification process may, and often does, turn up possibilities that point the way to whole new generalizations that had not been foreseen, and may turn the investigation, begun for quite other purposes, into entirely new channels. And so it may be, that, in the course of investigating the distribution of national income, the inductive worker may happen upon results that point to the solution of other problems, such, for instance, as why it is that capital tends to flow into speculative enterprise, the profit factor outweighing the safety factor. It is the merest truism to say that one never knows, in an economic investigation, what surprising and illuminating information may be revealed.

But the main use of the statistical, quantitative tool in economics is to determine the truth of generalizations previously made, just as in the other sciences. And here it seems pertinent to observe one of the handicaps of economic investigation. There is no field of human activity where there has been displayed so little authentic reflective power of a disinterested sort. And there is very little expected by the world at large.[1] Considering the lack of social approval that so far has been built up in support of genuinely disinterested effort to solve economic problems, economists may be said to have done remarkably well in advancing so far as they have along the way of experiment. Investigators in this field had to learn, as their first lesson, to utterly distrust any observation of any person even remotely connected with the profit system of business. One's economic interest seems to be the most subtly obscurantist enemy of rationality that can be encountered. The burden of the unappreciated and difficult scientific effort with the materials and forces of the whole industrial range rests solely and inescapably upon economists. It is they who must make prognostications and who must do the work of substantiation, however small the immediate rewards may be.

An instance of the need and lack of this effort for substantiation is furnished by some of the too-easy assumptions of earlier economists, one of which, to choose an example, concerned the mobile nature of labor and capital. The truth seems now to be that there never was so great a mobility of these productive forces as was generally assumed,

[1] An illustration of what is meant here was forcefully presented to the writer when a nationally known business man who would be thought to be among the least likely to err in this way, remarked in the course of an address before The Labor Discussion Group of New York City that, logically, the Professor of Finance in a School of Business ought to be the wealthiest man in his community. This reveals the complete misapprehension that exists regarding the true function of the scientist in the economic field. The Professor of Finance would scarcely become wealthy if he really were a scientist.

but this is one of the supporting assumptions of classical economics without which it cannot stand. A little of the laboratory work that is now carried on by such agencies as the Institute of Economics or the National Bureau of Economic Research would have destroyed this illusion before it had got fairly started on its century-long course.

Another prominent instance of this same sort of illusion and also, of course, of the part that induction will play in future in settling the great controversial questions of economics, is the influence that observed facts will have in resolving one way or another the important difference of opinion that exists about the fundamental course of industrial evolution. The question presents itself in some such way as this: shall man have to adjust himself to economic institutions or shall these institutions be forced to adjust themselves to man? Incontestably we have been acting officially for the whole of the period since the advent of power machinery as though it were the business of man to make himself fit into whatever kind of life happened to develop incident to the efforts of business to cheapen the production of goods and to spread the margin between costs and selling prices. But there always has been an active opinion on the other side. Robert Owen, Charles Kingsley, Karl Marx, J. S. Mill, and, almost universally, the present older generation of academic economists in America, have agreed that industry ought to be made over more or less to suit the needs of man. This of course followed from the Benthamic ideal of the greatest good. It ought to be remarked, however, that with most of these economists a side issue has engaged their philanthropic impulses—the problem of the distribution of wealth. This is distinctly palpitating with the wrong emotion. It does not make any grand difference to a man who works in a city factory and who lives in a crowded tenement whether he has command of the little more or less of the goods of society that are at issue in the theoretical struggle over the distribution of wealth—fundamentally. Of course it may mean the difference between having bread and butter or bread and butter and jam, or the difference between having a talking machine or not having one, and so may seem to him of great immediate importance. But this is too slight a change to really matter much, socially. Better distribution would not change his way of life. Only whole socialized programs affecting industry can do that; and these programs are wider than distributive economists would have us believe.

There are those who think the industrial factor fundamental and unchangeable really; that is to say, the fact of cities, factories, homes and churches as we have them now, the product of loose and undi-

rected industrial forces. And there are others who feel that we ought to formulate programs for reordering the whole arrangement from beginning to end. They base this notion on the unchangeable nature of man—as they conceive it—as he exists and has existed for thousands of years. He never can function well in cities, factories and tenements, they say, and so the only intelligent method of procedure is to create an environment in which man can be happy, however great an effort this may appear to be at first, and however much in the way of destruction and rebuilding it may involve in the process. Proposals for such reorganization range all the long way from anarchism to socialism, from economic federalism of various kinds to the new freedom which is the *laissez-faire* ideal; and from the general application of utopian idealism to the definite programs of the Guild Socialists. But the common element in most of them is the notion of remaking the world to suit a fixed and unchangeable human nature.

In all the welter of proposal and counter proposal, of liberalism and conservatism, strictly held, there is never very much said about projecting immediate steps and seeing—by some short-cut process, if possible—whether and how they can be attained, of laying out programs which involve the action of forces that can be tested in reality. And most of those who construct projects of new roads to freedom for man seem not to be very anxious to know whether they have actually got hold of a piece of workable and useful truth with that same quality of anxiety that moved Galileo and Newton and served to start Darwin off upon a lifetime of research. Most proposals seem to be exercises of the ego, rather to be defended than to be tested. But the way of reason surely lies in another direction.

We may examine this illustration a little further since it seems to bring out the elements of a problem that only induction can hope to solve. We may go on to the observation that it is questionable, in the light of our present psychological knowledge, whether man cannot make many of the necessary adjustments inside himself, whether the human twig cannot be bent and the tree inclined for social purposes. Perhaps a few years ago we should have said that it could not. Graham Wallas[1] and William Mc Dougall,[2] who, between them, took the world of social science by storm, seemed to imply just that. But sober second thought has seemed to indicate that it cannot be so. Professor E. L. Thorndike, for instance, frankly defines the educative process as that of "changing human nature from what it is to

[1] In *The Great Society* and in *Human Nature and Politics.*

[2] In his *Social Psychology* that has run to some seventeen editions.

what we want it to be"[1] and this implies a human nature that is very plastic indeed. Also Professor John Dewey's conception of habit[2] as a mechanism of adaptability seems to give a new clue to human plasticity that, when we stop to consider, we realize is after all one of the characteristics of men that appears prominent to the most casual observation once we learn to look for it. We are led to suspect from these and other developments[3] that man can certainly do at least some of the adapting himself, and that perhaps we can go further than we had been thinking we could go in permitting industry to develop its own inevitable characteristics in its fumbling search for lower costs of production. But just how far? That we do not know. And we can formulate no worth-while program until we find out. What we do know leads many to suspect that the adjustment of men and industry must be a co-adaptive process. But we haven't any light on how far either factor ought to give way. And inductive measurement can be of the very greatest service here. It can answer these questions; and there appears to be no other way to get an answer.

There are other questions too in the solution of which this kind of effort can be of the greatest service as a precondition to the intelligent formulation of proposals for change. One of these concerns the whole range of economic behavior.[4] Economic behavior is only one kind of human action but economic motives appear to lie very deep—perhaps even deeper than Freud conceives of sex motives as lying. If his conception rests on the *perpetuity* of the race, economic motives rest on the continuing *existence* of the race. And so they underlie and color all our conduct. But how much? And faced with this question, we can only confess ignorance. And to confess ignorance here is to admit that we cannot surely formulate any kind of a program for advance because we shall not know whether it is advance or whether it is not.

This question of economic psychology inevitably raises further questions that must find answers and that cannot be answered without inductive study. For instance there is an old and deep confusion in economic theory concerning the mixture of motives in men. Ever since Adam Smith laid it down flatly in a famous phrase that "It

[1] In his address at the opening of Columbia University in October, 1922.

[2] In his *Human Nature and Conduct.*

[3] Cf. for instance, S. N. Patten's various scattered essays on Economic Psychology.

[4] Cf. for a general and historical treatment of theories of behavior, Z. C. Dickinson, *Economic Motives.*

is not from the benevolence of the butcher, the brewer or the baker that we expect our dinner, but from their regard to their own interest," it has been tacitly assumed by most economists that this was the way in which men were actually persuaded to action. He went on to say in this same passage that "we address ourselves not to their humanity but to their self-love, and never talk to them of our necessities, but of their advantages,"[1] and, although economists have restated this many times[2] it has never been better put. It implies that we must rest our aspirations for the economic system upon a theory of human motivation which depends upon the most fundamentally anti-social traits that man possesses. What is a vice in an individual will by economic legerdemain be erected into socially beneficial action. If this mystic paradox were not so tenacious, it would not deserve serious consideration; but it is persistent and perhaps nothing can disclose its fallaciousness but quantitative study of the motives of men and the slow building of a whole new general theory of economic motivation.[3] Until the present time no effort has been made to determine the truth of this assumption by any quantitative method and it is this method which alone can establish facts. But it must have been apparent always just as it is now that if the untruth of it were once shown, one of the main props of the theory of the classicists and of the profit system in industry would be completely knocked out. And the reason why it has never been attacked can only have been the essentially deductive character of economics and the lack of experimental attack.

It is further true, also, that inductive study in the market place and the factory might determine whether men have come to lean more heavily upon self-interest and profit-seeking to keep the economic machinery running than is warranted by the motives that actually stir men to action most effectually; it might also help to deter-

[1] *Wealth of Nations*, Bk. I, ch. 2. (Cannan ed., 16.) This is of course not original with Smith. It goes directly back to Mandeville's *Fable of the Bees*, which Smith attacked in his *Theory of Moral Sentiments*, pointing out substantially that "private vices, public benefits" was an inaccurate phrasing which should read: private interests, public benefits, and which influenced his whole treatment in the *Wealth of Nations*. What Mandeville pointed to as "vices" seemed to him only the natural propensity of men to seek their own advantage and so should not be pointed to with opprobrium. What was natural must be also in some way good.

[2] Cf. for instance Carver's *Essays in Social Justice*.

[3] For an example of a discussion on this point see Patten, "Mandeville in the Twentieth Century," in *Essays in Economic Theory*, 357 and Mandeville in the Twentieth Century Replies," by E. R. A. Seligman and J. H. Hollander, *Amer. Econ. Rev.*, viii, 338–49.

mine how deep the imposed folk-way of trusting to the profit incentive has become imbedded in our social fabric and what could be done to uproot it if that should seem desirable; it might, in other words, assess the harm that has been done by our acquisitivism and it might tell us the alternative possibilities if our dependence upon profit incentives actually turns out to have been a costly one, as many economists believe.[1]

Still another, and a rather different sort of an illustration, of the immediate need for inductive research is the obvious need for study upon the question of the reality of American prosperity. The question whether we actually have a surplus or actually have a deficit has never received a categorical answer. Are real wages rising or are they falling? Is the possibility of the payment of increased wages becoming greater or is it becoming less? These questions are pressing. We need to know—and to know immediately—whether we ought to formulate our economic programs with reference to the use of a growing surplus or whether we need to formulate quite different ones as defenses against an ever-impending deficit. Deep differences of opinion exist; but for the most part, again, these differences are implicit rather than explicit. One group assumes surplus, and another assumes deficit, and it makes a difference to the whole area of economic thought. If we could know the facts, it would be of immeasurable benefit.

One might go on for almost any length pointing out problems that can only be solved by the use of induction—important problems too that underlie whole philosophies and attitudes and whose solution would revolutionize the thinking of our generation. But perhaps enough instances have been adduced of a sufficiently fundamental nature to show the need.[2] It remains to sum up the general use of induction in economics:

1. To assist in laying down probable trends.
2. To assist in gauging probable results of departure from present practice.
3. To assess the gains or losses to be made from new methods or new programs; and the costs or gains of past and future uses of old methods.
4. To furnish the material for constructive proposals for betterment.

[1] Cf. Tawney, *The Acquisitive Society;* Taussig, *Inventors and Money-Makers,* etc.

[2] The needs for induction and its methods are further discussed in Professor F. C. Mills' article "On Measurement in Economics," elsewhere in this volume.

5. To test the actual results of proposed programs as they come into use, so that they may be consciously extended or restricted as they develop well or ill.

8. THE TEACHER

The practice of economics as a consciously experimental science is new; but the analysis of economic institutions and principles is very old. And the connection of what we call "economics" with teaching as a profession is old. Most of the economists from Adam Smith down have been teachers and almost all the economists of the late nineteenth and early twentieth century were university professors. It is true that between Adam Smith and Alfred Marshall there were some economists who did not teach—Ricardo, Marx and the Mills, for example—but if they had no formal University connections, they were, nevertheless, pedagogues. Mill and his father certainly were and Marx[1] reminds one inevitably of an elderly professor. It was however, during the last generation that the profession of economics settled definitely into the University background. Smart, Jevons, Marshall, Cannan, Böhm-Bawerk, Schmoller, Conrad, Menger, Gide, to name a few of the more important Europeans, and Adams, Patten, Clark, Ely, Taussig, Seligman, Carver, Fetter, Hollander, J. B. Clark, James, Hadley, Veblen, and many others in America—all were teachers.[2] And economics suffered somewhat because the practice and the teaching of the science were such very unlike activities. The effort of the teacher is not first of all that of suggesting ways of improving industrial arrangements or of testing the worth of industrial forces that are actually at work, but, by its very nature, an effort whose greatest significance lies in its success in communicating to students the accumulations of scientific knowledge that society has been able to build up. And so men who were first of all teachers would not be expected to make any sweeping changes in theory. With a few exceptions it is a valid criticism of the whole group that they created no new theory.[3]

The pedagogical methods of this generation, too, were a drawback so far as advancing the cause of teaching technique is concerned. For we are now faced with a teaching problem they did not have to contend with in their day—mass education. Their groups were small; there could be many personal contacts; and on the whole a teacher's activities could consist in being the active leader of a

[1] Cf. J. S. Mill, *Autobiography;* Wilhelm Liebknecht, *Karl Marx; Biographical Memoirs.*

[2] The reader is here referred to the bibliographical appendix to this volume.

[3] I should except Patten, and, in another genre, Veblen, but hardly any others.

small group. But now economics has become indefinitely complicated both in itself and in the fact that it has to be communicated in a new way to immensely larger numbers of students. The old lecture method of teaching inherited from the old world—where practically all of these economists were trained—could not at first show its inherent defects because it was so finely supplemented by their personal direction of students' work. But as they grew older the numbers of students were immensely increased—and their teaching methods failed to change to meet the new conditions. And now we are becoming aware that, though we knew them as great teachers, they contributed nothing to us, in the way of pedagogical method, that we can use. We have to begin all over; and, curiously enough, the place we are having to go to learn how to teach is the kindergarten—for there teachers know how to teach.

We know now that a school student is not a vessel into which refined and clarified wisdom may be poured. We know that a great deal of the refining and clarifying must be done in the student's own mind. We have discovered that education is not passive but active; that a lesson learned by rote is a lesson forgot. The older generation avoided the problem as the numbers of their students grew by utilizing the lecture device that, however, grew more and more formal; but we cannot follow so easy a path. That generation also wrote text-books from its lectures—numbers of them. And, as classes grew larger, instructors of younger grades were expected to teach by expounding them. The utter futility of this as educational method is beginning to dawn upon the whole academic world, though unluckily it dawns upon the world of higher education last. Teaching used to be done in the grades in this way; but it was long ago given up; and it must be given up in the Colleges and Universities too. University teachers must learn to teach as well as it is being done in primary schools—this in addition to providing the material to be taught.

The newer methods of education respect the intelligences of students quite as highly as they respect the intelligences of teachers. These methods consist concretely in constructing typical situations in which the minds of students are put to it to find solutions. And when the student fails, then is the moment of opportunity—the psychological moment, if you will—for the teacher. He suggests ways out of the difficulty. The hope is that the student will leap at suggestions because his mind has already fumbled for them, feels a definite need of them, and so sees their significance. This is the new conception of the teacher's task. And this must be the new conception

of the teaching method for economics. The older generation thought it necessary to get into the students' heads somehow, the whole symmetrical structure of economic principles as it had been built up through the accretions and refinements of many years and many minds. The new generation knows that this is a hopeless ideal, and that it is a benefit to no one but the teacher himself. He knows that students' minds will not work with such predigested material. He knows that there is no surer way to smother that priceless spark of reflective ability that is the creative force of the world.

It is only by the most extraordinary chance that the undergraduate student of these days can find himself in contact with teachers who are also historians, inductive workers or theorists; but it does happen sometimes. And then the student is in luck, for then he works with a person who is interested in the real materials of life, with real problems which press for solution. Usually, however, it cannot happen, because most of those in the lower classes cannot reach the upper classes: the mortality is bound to be high. Mostly, only the upper-class students are able to have such ideal instruction. And then, too, the student who goes in for such a profession as medicine or engineering does not reach this instruction: he begins to specialize before he gets so far. For all these reasons the beginning course must be constructed with special care—remembering the conditions—in the attempt to activate the intelligence of many students and to give this intelligence interesting material on which to work and adequate assistance when it is needed.

9. THE HISTORIAN

In France the teaching of economics is usually done historically and there is a good deal to be said for this as a method. It is better than to attempt to introduce students to a completed body of theory as has been characteristic of the method in America, for the history of doctrine is the history of proposals for change. It displays the attempts of thinkers in the past to come to grips with the problems of their times; and it records their failures and successes. As such it will always have a prominent place in the training of economic specialists. They will come to the study with a lively desire to know how these attempts have been made in the past because they bear so obviously upon the same sort of effort that must be made by them in their future.

There are different ways of presenting the history of doctrine, of course, some of which are better than others. As good a way as any, perhaps, is the method used by Professor Mitchell in his graduate

course on "Types of Theory" at Columbia. He is very careful in analyzing the work of such men as Smith or Ricardo to as completely as possible reconstruct the world they lived in, giving most weight to the elements of the contemporary world that impinged directly upon them and so influenced the course of their development. Adam Smith's connection with the commercial life of Glasgow, for instance, bore directly upon his conception of national welfare as dependent upon the prosperity of the entrepreneurs of the beginning industrial system. And likewise Ricardo's conception of the relations of profits to rent and wages was directly influenced by the fact that he was a city man and a stock broker.

When the significant elements of a thinker's environment have been reconstructed—and this, it should be said, is very difficult to accomplish because of the many elements that may have lain hidden for so long a time, not being judged important—and when we have the man's work itself, we are in a fair way to see the work going on, to understand how his results were arrived at. This is what those who are now definitely students specializing in economics will have to do sooner or later—work with the materials of their time at problems needing solution; and so we may expect that they will display an intense interest in the history of other minds that have been busy at some time with the same kind of effort. But it will be seen that it requires something more than the usual casual study and discussion of *The Wealth of Nations,* for instance, to get this kind of a view of the work of Adam Smith; and, after all, this complete picture is the only kind of a view that counts for the results that are desired.

It will be seen too, that this is a quite legitimate part of the training of the modern experimental economist whether he is to be teacher or research worker—or both—because experimental economics means actual working with and thinking about industrial forces; it means making proposals for change; it means the reduction of forces to their simplest elements and simulation of their qualities and effects in the laboratory; it means acute social analysis with these ends in view. Adam Smith was interested in seeing a program of economic liberalism put into effect, which included free trade in foreign commerce and *laissez-faire* at home; and a good part of his work must be thought of as propaganda in the interest of this liberal—at that time—program. He had none of the tools of research at his disposal which are being developed to-day, and so he was forced to use his very shrewd—but for all that very faulty, according to our standards,—powers of observation. The difficulty was, as might have been expected, that, on the whole, he saw only what he most wanted to

see. This is an illustration of a common human frailty that is very important in the results it has had, and may still have, for science. But we are in a better position to guard against it now than were the scientists of the nineteenth century or of any time before. It will always be interesting and valuable, however, to study the way in which the solutions of problems have been reached in the past. The very shortcomings and errors of the older economists hold valuable lessons for us, perhaps even more useful than the lessons of right method and correct solution there are to be learned from them.

We can smile now at the way in which Marx accepted classical premises and, by twisting them to suit his own purpose, constructed a "scientific" socialism, an apocalyptic doctrine that shocked several generations of good Victorian people; but we can see now too that he was only doing, essentially, what the rest of the economists were: projecting proposals and defending them. He was perhaps worse than the rest in trying to remove his speculations from the experimental field, but not much worse; all the older economists felt as securely based as did he upon natural law and rational human nature. The great verifier, time, has had a chance at them, but the incalculable damage of their mistaken conclusions can never be estimated, and we need to aviod making the same errors in the same way. We want a quicker verification; and we have the possibility of it in our new development of conscious tentative suggestion and short-cut testing. The contribution of the study of history to this end, so much to be desired, lies both in a complete understanding of the way in which mistakes of the past have been made and in a comprehension of the results older workers got with the materials with which they had to work.

10. THE ETHICAL EMPHASIS IN EXPERIMENTAL ECONOMICS

What we do as we go about making, getting or using goods is supremely important not only to ourselves but to every other member of the community; and there is no useful purpose served in pretending that this is not so—that a man's business is his own affair, that he may choose or use as he likes without affecting any one very much but himself.

Any problem has ethical implications if it really is a problem; and this is because of the very need men have to find an answer to it. The ethics involved in finding answers to the problems of economic life is two sided, for not only do we judge conduct by its outcome but the very standards of conduct which *are* ethics are to be

thought of as instrumental. This is to say that our standards ought to be formed with a notion that the conduct they inspire is to be a useful conduct. Conduct is judged by ethical criteria; but ethical criteria are judged by their issue in conduct. The resolution of this paradox is, however, a simple common sense rule. What is wanted is the kind of conduct that leads to higher living levels and greater achievement; and both conduct and the standards of conduct must lead in these directions.

Industry—which is a large word covering the goods-making and goods-getting activities of life as well as a large part of the goods-using activities—is so important and what everybody does in industry is so important, that no intelligent approach to it can escape the problem of consequences—the ethical problem, the definition of what is good and what is bad in industrial activity, and how individuals and groups ought to act or ought not to act in industrial life. For no step can be planned, no social control can be begun, no practical programs can be formulated, until the good of taking this step or that step has been discussed and rationally settled. The only alternative is to go on blindly as too often we have gone on in the past; and the results in human misery of this method are by now too apparent to need comment here.

This raises again the concept of experimental economics that we have beeen discussing, for though it may not seem to be so at first an experimental economics is thoroughly ethical. The plea for greater experimentalism is, it is true, a plea for the more extensive use of quantitative tools, for more accurate measurement, for a more complete temporary abstraction of problems from their operative settings for purposes of classifying, verifying and testing; but it is just this process that can and will serve more faithfully whatever ideal ends ethical considerations may dictate. It will, indeed, make it easier to define our programs as well as to perform them once we have seen them clearly.

Unless we are willing to admit an inherent and inevitable inability of human effort to better life, and the certain ultimate defeat of all human purpose, we must, if we face this dilemma honestly, find ourselves committed in one way or another to the great adventure of mankind. It may be that we can, some of us, like Peer Gynt, blunder through our fragments of existence, grasping life nowhere, facing none of its deep quandaries, tasting none of its bitternesses or delights. But no person in whom the spark of reason glows is able to do this effectively; it is so apparent, as Irwin Edman has said that

"They do not live who choose the middle way,
Whom ecstasy and anguish have not known" . . .[1]

that few of us do finally choose the middle way. We do commit ourselves. The difficulty is that the committing may not be done in full view of the facts and in a way that possesses the possibility of leading to the large goals we all of us acknowledge as desirable. Our aspiration may be linked as closely as may be with intelligence but if intelligence has fake representations of real life to work with, the solutions it aspires to are worse than worthless—they are disintegrative, pernicious. This is one reason why we differ about practical problems. But the fact that we do differ about industrial problems, and differ so bitterly too, shows our commitment to the notion that life can be remade according to ideal ends.

If it is true that we differ about the means to the approach of commonly held ideals, it is from a number of causes. In the first place we lack genuine social criteria. Also we lack definite and immediate objectives, though we may fully agree on the larger ones such as the desirability of human happiness. And we have no clear realization of the practical determinants of the reordering process; indeed we sometimes act as though there were no determinants, as though we could do whatever we please by any program, and immediately at that; or else we act as though some wholly unimportant and wholly irrevelant social fact were an underlying determinant. These confusions are all of them disastrous.

The questions of criteria and objectives are too large to be discussed in detail here but what seem to be the main considerations in formulating such useful industrial guiding points may be suggested. Perhaps the economic behavior of an individual or a group might be judged good or bad as it leads away from economic deficit and toward economic surplus, as it assists in turning economic surplus into real prosperity and higher levels of living by the wide and fair dissemination and the wise use of surplus, and as it helps toward the coadjustment of men and their industrial institutions.

Concretely, just what kind of behavior is good in these senses can only be determined by maintaining a definitely experimental attitude, by judging behavior by foreseen or actual results. This is to say that our ethical rules have to be conditioned upon the results of experimental researches so far as that is possible; and when these are not available, have to be judged by consequences in action. One

[1] These lines are quoted from his exquisite sonnet in *Harper's Magazine*, Dec. 1922.

thing is certain about them—that they will need to change as industrial conditions change. Professor Ross among others has pointed out the ethical degeneracy that may follow from adherence to a fixed and customary morality based upon definite actions [1] and has shown the particular irrelevancy of an old morality in an industrial age. Goodness is relative. The good is good only when it results in good. This is a rather bare and banal statement of a code that many thinkers have arrived at and that was put so beautifully in Christ's rebuke to the Pharisees: "the tree is known by its fruit." [2] And one might think from its constant reiteration in systems of ethics from His time to ours that it ought not to need further elucidation. But unfortunately, one has only to observe the conduct of the world from any vantage point to see the hardness and the permanence of its crust of morals, built around definite old reactions to a past way of life. The good in mediaeval life is an insufficient good for our life; the good of the eighteen-nineties is an insufficient good for our life; and it may be that the good of the twenties will be an insufficient good for the thirties—certainly it will be if the great shifts of control and productiveness which now seem imminent materialize at all. Industrial good conduct must have a flexible measure, centering about the criterion of the provision of as great quantities of the instruments of good living at as low a human cost as may be. This makes ethics an instrument of progress, not a series of inspired and permanent rules of conduct.

This only succeeds in touching the ethical problem of economics but it touches it at a vital place. It must be said immediately, however, that the determinants of action ought to be defined more clearly for the present. We can, for our time, see the limits we move between in accomplishing ethical ends. There are the determinants fixed by the conditions nature imposes. There is meant, for instance, the fact that industry, as things are now, gravitates to sea level, and that steel industries must be placed in a compromise position among coal fields, iron mines and limestone rock deposits. These determiners are, for the immediate present, fixed. A forbidding price has to be paid for the violation of the limits they set—a price that is being paid as I write in the Ruhr, in the Balkans, and, in fact, everywhere where the impossible political dogmas that were incorporated in the Treaty of Versailles were put into effect. They are the easiest determinants to discover as they are the easiest to accommodate ourselves to once the discovery has been made. (What a confession of social unintelli-

[1] In his *Sin and Society.*

[2] Matthew, xii, 33, cf. also Matthew iii, 10.

gence is the anarchic state of Europe to-day!) Then too there are the more transient determinants which may be called, in Veblen's phrase, "the state of the industrial arts." In fact we have come so far and no farther in the application of ingenuity to the solutions of the problems posed by nature; we have made so many advances in industrial technique and no more. The fact of the present stage of this technique is one to be reckoned with.

And there are still others. There is human nature. We cannot surely say what human nature demands of industry. But the fact of our dissatisfaction with the factory and the rest of our characteristic institutions—the evidence of which is universal—betrays our belief that there are some human demands that ought to be met. We must locate and define these and accept them as determiners for the conscious changes we shall make in industrial arrangements.[1] It may turn out, of course—and recent developments point this way—that there are no unchangeable elements of human nature and that what have been described as human demands are merely ethical demands, but if this should be true, there still remain these ideals as determiners.

The experimental economist who is interested in formulating changes is more or less conscious of these goals and of these limits in view of which, and within which, his programs must be constructed. And economic theory, strictly defined,[2] is the actual formulation of these suggestions for change, these solutions of problems. But there are some economists and there are some other philosophers who hold the view that ethics and economics ought not to have any contacts—that, in fact, economics can never become a science so long as these contacts exist, so long as the ethical urge lies uppermost in the economists' minds. This position seems wholly untenable in view of the nature of our problems and of the nature of the science which is the means of their solution. A great part of economics—and a growing part—consists of this formulation and trying out of reconstructive programs; as such it becomes suggestion for new forms of institutional structure and new forms of conduct which will result in different and better adjusted physical arrangements, different kinds of activity and different conditions of welfare. But this is only to say that such a situation does exist, not that it is desirable that it should

[1] Cf. the present writer's "Human Nature in Economic Theory," *Jour. Pol. Econ.* xxx, June 1922. Also Z. C. Dickinson, *Economic Motives*, and J. A. Hobson, *Incentives in the New Industrial Order.*

[2] Cf. the writer's "Theory and Practice" *Amer. Econ. Rev. Supp.*, xiii, 107 March 1923.

be so. This can only be determined by its results. And there is ample illustration of the real fruitfulness of ethical economics in the work of many of the younger economists. Professor W. H. Hamilton, for instance, usually works with a complete consciousness of the desirable results to be obtained. In his recent "Theory of the Rate of Wages"[1] he began with the assumption, clearly implied, that wages ought to be raised in the interest of human welfare. He intended to create a theory which should suggest a way in which this might be accomplished.[2] And his success with his problem depended wholly upon whether a realizable program for raising wages could be worked out. This seems to be the correct experimental method; at least in Professor Hamilton's hands it turned out to be a fruitful one.

Other illustrations are not difficult to find. Professor Mitchell's whole work upon the problem of the business cycle[3] is conditioned upon and motivated by the belief that the results of business depressions are bad and that they can be eliminated. He attacks the problem with the formative notion that a cure is possible. And Professor J. M. Clark's whole approach to the field of economic theory has been ethical. For instance part, at least, of his theory of overhead costs carries the idea that overhead costs in accounting practice actually result in throwing the burdens of overhead upon labor[4] not in socializing and distributing them. Another instance of the ethical orientation of theory is Professor Irving Fisher's theory of the stabilized dollar,[5] a theory too well known to need comment here. Its relevancy lies in his premised belief that the stabilized dollar will have beneficial social results. He stakes his whole argument upon the good effects to be obtained.

All this means that economics is ethical, inescapably and rightly so; and it means that the ethics involved is an experimental ethics. The economists of the new generation are making tentative proposals which they believe to be hopeful, but which they desire above all to see tested and verified or disproved. If the suggestions prove to

1 "A Theory of the Rate of Wages," *Quart. Jour. Econ.*, xxxvi, 581, August 1922; since elaborated as *The Control of Wages* in collaboration with Stacy May.

2 "The inquiry . . . has three objects. The first is to find a theory of wages relevant to the problem of how real wages are to be raised. . . ."

3 Cf. *Business Cycles*, and *Business Cycles and Unemployment*.

4 "Some Social Aspects of Overhead Costs," *Amer. Econ. Rev.*, xiii, 50. Cf. also "Overhead Costs in Modern Industry," *Jour. Pol. Econ.*, xxxi, 47–64; 209–42; 606–36, 1923.

5 *Stabilizing the Dollar;* also published hearings before the committee on banking and currency of the House of Representatives, 67 Cong., 4 session on H. R. 11788. Gov't. Printing Off.

be good they ought to be put into practice; and not only put into practice but also become a part of our codes of conduct. If professor Hamilton's theory of wages proves to be a fruitful one we shall have in it a new standard for the judgment of economic conduct. The performance of individuals or groups becomes good or bad as it contributes to or detracts from the success of the new program for wages. The inception of the idea was thus an ethical purpose; and its results must be ethical in the sense that they will require of us a new type of conduct. It is impossible to see any way to separate economics from ethics; and it seems further that, even if it could be done, it would be nothing less than disastrous for a young science that hopes to become more and more important and useful and for a world which needs to have the work of the economists directed toward the betterment of its material situation. For the betterment of the material situation is the kind of achievement that leads to higher levels of living.

11. THE TREND OF ECONOMICS

The phrase "trend of economics" doubtless presents different pictures to different minds but to mine they present the idea of a theory inductive and deductive, projective and experimental, hypothecative and substantiative. And this would be the course I should lay out for economics, if the power were mine, as I believe it is the course that will be followed. Economics is developing a freedom of suggestion, is enlisting splendid new imaginations, is creating a great new technical machinery for quantitative measurement and testing; and all these are being united.

It will be a happy circumstance for society if the universities can go on working out—as they have begun—more and more comprehensive programs for research based on the new experimentalism. Education joined to research is ideal education. Because of the extremely high cost, the introduction of undergraduates to industrial problems can never be carried on in connection with research, probably—not, at least, so long as educators continue to be faced with the necessity for mass education. The best that can be done, for the present at least, is the simulation of research stepped down to their powers; but the training of economists of all kinds can be more and more successfully joined to research and the effort is being made everywhere. It can be said that a free university is almost the sole source from which such critical social examination can come as will be involved in the new experimentalism just as it can with equal truth be said that it is the only place where the training of the new

generation can take place. Without projects for change which come from a disinterested source, society lacks wholly any industrial directive force at all, for industry itself has no thoroughly socialized ideals. Rather, it would be fair to say, profit is the ideal of the business organizations that operate industry. But profit-seeking is a disruptive force, essentially anti-social, that leads to other goals than that of social welfare. And if the social good is to be obtained, and not just here and there the good of an individual or a group, if we are to have, in this sense, progress, it can only come from a constant reëxamination of ideals and constant redirection of social forces toward their attainment. An experimental economics developed on the side of theory for the projection of reconstructive programs, on the side of research for testing and substantiation, and on the side of teaching to provide new workers and new attitudes and to insure the continuity of knowledge as well as to acquaint men in general with the nature of problems and the general means of their solution—an experimental economics developing in a free university where examination and criticism of industrial forces are encouraged and rewarded, would possess that hope for the future that men are obliged to try to realize. Lacking it our civilization, so fundamentally industrial that only industrial experts can solve its problems and create progress out of inevitable change, may slip and regress, falling into the mad desuetude of ruin that overtook Assyria and Egypt, Greece and Rome. Our civilization may, with all our hopes and all our plans fall from the tree of time and rot like a withered leaf in the mold of common earth. There is that chance.

But alternatively we may think of ourselves in different metaphor, not as a leaf on the tree of time but as an historical force, with power over time, over space, over mankind itself. We may master our fate with the help of that precious spark of reason that glows within the human mind, hidden by prejudice and superstition, buried under layer after layer of primitivism, threatened by the surging impulses of a dead past.[1] For that spark is known sometimes to glow with a light that shines through the covering layers; and it sometimes burns with a clear flame that illumines the past, the present and the future. It is this flame that must be fed. It is the hope of mankind.

It is the business of the free university to tend this flame. Least of all institutions should our universities be given over to the uses

[1] Sir J. G. Fraser: *The Golden Bough.*

of ritualism and conservatism, for then they protect what has been or what is as fact or idea and dignify them as more important than the things that may be. Least of all should they protect the two-hundred-year old institutions of industry, the most transient institutions of our time, from the free thinking and experiment of economists; for industry is a social instrument which, if freely experimented with, and if directed to the uses of men, holds definite promise for the future. Industry can lay the basis for any higher life; and no higher life can be built without an industrial basis. In this sense the new industry will make the future. It can free mankind for whatever life seems to men good. It remains only to be said that an experimental economics is the condition of this freedom.

REGIONAL COMPARISON AND ECONOMIC PROGRESS

by

WILLIAM ERNEST WELD

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REGIONAL COMPARISON AND ECONOMIC PROGRESS

1. CERTAIN DEFINITE TRENDS

There are certain signs and tendencies of the last ten years that suggest the probable trend of economics in the coming decade. Three of these tendencies are particularly conspicuous. *First,* economists have not grown frenzied over abstract economic theory. Certain disputations there have been, but the temperature of the "listeners-in" and even of the disputants themselves has rarely risen to fever heat. In a few instances, such controversies have been accompanied by sustained interest on the part of the economists of this country, but this interest was due not to the longing to apprehend abstract truth, but to some practical application which might be made of the conclusions arrived at. At a recent meeting of the American Economic Association, a lively discussion developed over the proper definition of "income," not because such a proper understanding was an end in itself, but because of its bearing upon the income-tax law. The economist of to-day is not so interested as his teacher was in such abstract problems as how and when rents would arise on Robinson Crusoe's island, if all the land were of equal productivity. In fact, this island has been neglected in recent years by the students of economics. The present-day economist is profoundly interested in human welfare, and the doctrine of "truth for its own sake" in such an engrossing world of actualities does not have the chance to make itself felt. The World War is partly responsible for this tendency, but not entirely; it had shown itself before the war began. Then the war came and forced upon the nations definite problems of production, consumption and distribution for the prosecution of the war and the maintenance of the civil population. The future had to take care of itself. With the conclusion of peace, the economic problems which faced the nations of the world were of a different nature, but were even more far-reaching than those connected with the carrying on of the war. They have not yet been solved. The economist must face them, and give the help the world has a right to ask of him. The next ten

years will find him busy at this task. The goal of his efforts will be social welfare.

Second, economists in recent years have neglected the "old deductive approach" and turned more and more to induction as a method of study. Used in this way, these terms, "induction" and "deduction," are misleading, because no complete act of reflective thinking can belong exclusively to either the one or the other order. The difference between the two seems to be partly a matter of position in the process of thinking and partly a matter of emphasis. The older method is reputed to have been inference from a principle, which was considered to have been firmly established, to some consequence of the principle in economic life. In many cases the principle was not applicable, because of the presence of other factors which over-weighted or neutralized the result. The inductive approach consists in examining the facts—the larger the number the better, and working from them towards principles which explain the facts. The most important reason why many of the students of economics are turning to induction is that they feel that the method of study generally used by the Classical School has reached its limit. It served a very useful purpose, but economic life is progressing toward a greater complexity; and the so-called "other things" are less and less likely to be "equal." Therefore the tendency during the war and since has been to search for the facts, to analyze them, and to draw the conclusions that seem warranted by the facts. This will doubtless be the more prevalent method of the near future.

Third, during the last few years there has been a notable advance in the use of statistics and in the graphic presentation of the findings of the statisticians. The evidence for this assertion comes from many sources, and reveals the fact that interest in the quantitative method of economic study is general and widespread.

Many large corporations have established research departments, in which they have placed trained statisticians to study their own problems. In some instances these studies have been far wider than a quantitative analysis of costs of producing or marketing their own individual commodity or service; they have included an examination of the industry as a whole, from the production of the raw material through all the intermediate stages to the hands of the final consumer. The corporations in which this advance has been most notable are the banks. Most of the large city banks are perfecting and enlarging their research departments and are publishing reports which have a wider social value than the advertising the banks receive.

Moreover, there has been in recent years an increase in the number of firms selling statistical service, relative to general business conditions. The inference is that the number of purchasers of such service has also greatly increased. It is surprising to find how many such firms there are in New York City alone. In this general class there are special groups, mainly engineers, which sell reports of a more specific nature. For example, chemical engineers have made studies of the coal industry as a whole, and the productive power of a unit of each kind of coal in a given plant where certain kinds of furnaces, boilers or stacks are in use. Another interesting example is the development of firms of evaluation, whose purpose is to sell information regarding the value of properties. Some of these firms limit their researches to very definite fields, and will not attempt investigations of other kinds of property. One firm in New York City evaluates mining, oil and gas properties. Its method is mainly statistical. Much of the interest in evaluation of properties developed because of the Income and Excess Profits taxes; the Government at Washington will not accept rule-of-thumb methods. Especially is this true in the evaluation of natural gas properties.

One of the interesting features of present-day economics is the over-lapping interests of the engineers and the economists. The statistical method of research is common to both. The authorship of books on statistics that have appeared in the last few years, seems to be about equally divided between engineers and students of the social sciences. There is every reason to believe that this increased use of the quantitative method in business and commerce will be maintained during the coming years.

In the schools and colleges there has been an increase in the number of students studying statistics and graphic presentation. Formerly, such study was considered a graduate subject. It is rapidly becoming an undergraduate study. In the School of Business of Columbia University the study of statistics has just recently been made a requirement for undergraduate study. It is the writer's opinion that the time is not far distant when most of the colleges and universities will consider statistics to be a necessary part of the undergraduate curriculum, and their faculties will not consider a student well trained until he is able to make and interpret simple quantitative measurements. Already, some of the high schools of the United States are teaching the simple rules of graphic representation of numerical data as a part of their courses in mathematics. The pupils are taught to picture statistical material by the drawing and interpreting of circles, blocks, bars and

curves, with the idea that such training will be helpful to them in their future studies.

That the general interest in numerical measurements is more widespread than formerly is suggested also by the quantity of such material that is now being printed. Not only is such data published in trade journals and in technical magazines, but also in more popular publications, including some daily papers. If statistical articles and graphic charts were over the heads of the general readers, and failed to interest them, the publishers would find it out and stop printing them. It is a hopeful sign of actual progress when the "average reader" prefers measurement to sonority and appraisement to suavity; and the doubter is encouraged to believe that democracy may yet win through.

To sum up: it is the writer's opinion that the majority of economists, at least of the United States, have a strong inclination towards those fields of economic study which bear directly upon the economic welfare of the people; that many of the students of economics are convinced that the order of study should be the search for principles through the analysis of existing situations; and that one of the most important methods of study in the near future will be the measurement and interpretation of quantitative data.

2. "REGIONAL COMPARISON" AND THE INCREASE OF WELFARE

If the writer is correct in his estimate of the future emphasis and method in economic research, the question immediately presents itself, "What problems should be studied, which when solved will contribute most to the economic well-being of society?" It is of no use to maintain that any one problem is measurably more urgent than any one of the others. Social problems are so interrelated that no one of them can be separated successfully from others. However the writer wishes to call attention to certain of these problems which have been neglected and to suggest a line of study which should yield high returns. The goal of this study should be principles inductively arrived at, which would be applicable to other conditions, after adequate modifications had been made.

There is a broad field of study, which we will call Comparative Regional Economics, which might well yield such inductive principles, and so make it more possible for backward nations to be brought into better alignment with modern progress.

The term "comparative" places little limitation upon the scientist in any direction. Most of our knowledge from infancy to old age is obtained by comparison. The measure of the intelligence of

an individual is his ability to compare. Wundt somewhere describes intelligence as the ability to harmonize disparate characteristics. A person of low intelligence can compare qualities which are obviously similar; it requires a higher intelligence to compare qualities which appear at first dissimilar and unrelated. In the social sciences, it is the business of the trained mind to make comparisons, if the advance to scientific principles is to be made. The difference between the "trial and error" method of obtaining results and the method of reflective thinking lies not in the absence of comparison and discrimination in the one case and its presence in the other; but rather in the necessity of actually seeing acts performed in the trial and error method and not having to see them performed actually—but only imaginatively—in the process of reflection. The latter is a short-cut to conclusions; comparison is usually present in each case.

Simple comparison may involve an examination of the same object at different times, or it may involve a scrutiny of different objects or groups of objects at the same time. We may speak of the former as *temporal* and the latter as *local* comparison. The scientist will search for likeness or difference in either *quality* or *quantity*, whether the comparison be temporal or local. The possibilities of comparison may be illustrated by a simple graph showing two curves over a period of years: the quantities at any two years which may be selected on one curve may be compared; or the quantities at any one year on the two curves; or the degrees of increase or decrease from year to year on the one curve; or the comparative rates of increase or decrease in the different years in the two curves. In such comparisons we find the starting point in the search for causes of change. When there are a number of factors, as there are likely to be in social causation, a comparison of the behavior of the different factors in various times, places or conditions brings extremely complex multiple comparison. Correlation is a refinement of comparison, just as the coefficient of correlation is a summary expression of the degree of relationship between the different series compared.

3. THE COMPARISONS THAT CAN BE MADE

It is possible to picture comparison in operation both in its time and place characteristics by starting simply with one or two individuals in one place and gradually widening the range of comparison by widening the area of the circle. This method of treatment may suggest the advantages as well as the dangers of different forms of comparison in economics. It is not feasible to suggest here

all the combinations for comparison that could be made; but we may mention those which seem most profitable. Later we shall mention the difficult subject of causation in its relation to regional comparison.

(1) Perhaps the most common form of economic comparison consists in setting one group of conditions and circumstances which directly affect an individual, over against another set of conditions also bearing upon his economic life but existent at another time. Let us say that the individual is a cotton planter. Last year he treated his cotton plants with poisoned molasses to kill the boll weevil; this year he has used the spray-powder method. Shortly before the picking season, he attempts to compare the results of last year with the probable results of this year, in order to determine which is the better method of treatment. It will be seen at once that while this is a simple comparison, yet the problem of causation is complicated. There may be not only one variant (the treatment for the boll weevil) but, possibly, a number of others: the infection of the seed that was planted, the time of the planting, the amount of sunshine and rainfall, the number of times the cotton was worked, and the like.

(2) The second form of comparison arises when one or two individuals make comparisons of different conditions and results appearing at the same time but in different places. Let us assume that two cotton planters meet over the boundary fence to discuss the problem of the boll weevil to which reference has already been made. One man has used one method of attack on the weevil and the other a different one. Let us suppose that they used the same seed, planted the same day and spent equal time and money in applying the poison. Even then elements of difference might enter which would make it difficult to decide which was the most effective remedy. The fertility of the soil, the slopes of the land or the efficiency of the labor might vary and influence the result. However, it is likely that the difficulties of discovering causation in this instance are not as great as in (1) above.

(3) Another common form of comparison consists in placing an individual's situation, condition or results along side of a measure of the central tendency of a group, which has some characteristic likeness to—or difference from—the particular situation in question. To carry on with the illustration we have used above, one planter may have used one method of attack on the boll weevil and a group of 500 planters may have used another method. If the individual planter's results are much more satisfactory or much less so than

the mean of the results of the group, then it would seem that a safer measure of the potency of the remedy had been obtained than if the farmer's results had been compared or contrasted with the results of one farmer. Comparison with many cases gives a surer test than comparison with any single case. The other items of difference that may have caused disparity of results are presumed to have been "averaged out" by being set off against each other. However, there is safety in numbers only when conditions are really comparable because of a *degree* of similarity. If three-fourths of the acreage of the group should happen to be bottom-land, poorly drained and not arable until late in the spring, then an average of the results of the group would have little value either for the purpose of summarizing or comparison. Again, in this form of comparison there is a still greater danger that the individual planter may have a result which differs from the mean of the group because of some factor other than the method of treatment for the boll weevil. With these qualifications in mind, one may say that there is safety in numbers.

(4) When the results of one group at any one time are compared with the same group's results at another time, we find another form of comparison. If the 500 planters used Hill's method last year and the government spray-powder method this year, we may draw relative conclusions regarding the value of the two methods after we have assured ourselves that the climatic conditions, the soil qualities, and the methods of tillage are similar. The wider the regional range from which the 500 farmers are chosen, the larger the possibility of disparity. But as a test of the two methods of combating the weevil, this is more satisfactory than the method described in (3) above, because the mean of difference in the other factors is not likely to be as great as the variations of these factors in the instance of one farmer.

(5) The last form of comparison which will be mentioned here is one that seems particularly important and that has been neglected in the field of economics: the comparison of the circumstances, organization, method or results of one large group in one region with those of another group in another region. The intricacy of this method of research is due to the number of factors which are likely to differ, such as variations in climate and natural resources, in the quality and quantity of labor, in the amount and form of capital, and in the methods of business and industrial organization. This form of comparison is useful both in suggesting the problems of importance which should be studied and in ascertaining causes. To choose simple examples: because the death rate of the United States in 1917 was 14 per 1000, and that of India 33, the student is faced with a serious

problem. If typhoid fever mortality is greater in the one region than in the other, the student is carried one step farther back—to drinking water and sanitation. Each factor in one region may be compared with the corresponding factor in the other region with an eye ever on the influence of such factors upon the final result. We shall discuss more fully this form of comparison, after we have inquired more carefully into the causal relationship in regional economics.

4. ECONOMIC CAUSATION

Many laborers in the field of economics hold that the economics of our civilization is so complicated and interwoven that inductive principles like those which Gustav Schmoller, Pareto, Marshall, Moore and others have been desirous of reaching, could never be worked out. Even if a critical analysis of one economic situation, existing at one time or in one region, should yield an understanding of a cause and effect relationship, yet the conclusion could not be applied to another situation existing at another time or in another region, because "the other things never are equal." They never *are* equal. But this does not mean that principles explaining causation at one time and place may never prove useful in analyzing the economic situations existing at other times and in other places. The differences and inequalities lie within the five canons which John Stuart Mill presented as a basis of the methodology of experiment. Great care must be used; but such comparison can and should be made. As Mill indicated, the differences are often as important as the agreements in the search for truth.

But the objection which has had most influence in limiting the search for inductive truth in inter-regional economics is the objection based upon the vagaries of human nature. It is pointed out that economics begins and ends in man; and human beings are such complex bundles of instincts, emotions, complexes and habits that infra-regional comparisons are dangerous enough, and inter-regional comparisons next to impossible. In the study of demand, how could one reason from the behavior of an American up-to-the-minute flapper to the probable behavior of a Buddhist priest? The former regards personal ornamentation as an important economic motive; the latter scorns it. The difference between the two in their drives to action seems to be very great; and yet the contrast might be drawn with profit. In the philosophy which underlies their economic motives may be found the indirect causes for the disparity in their ways of life. Two decades ago Schmoller emphasized the importance of human behavior in affecting economic results, and as his

thought ripened he found himself pleading both for the historical and the psychological foundations for inductive research. Since Schmoller wrote his *Grundriss der Allgemeinen Volkswirtshaftlehre* (1901–1904), the psychologists have made considerable advances in understanding human behavior. It is easier now than it was then to explain differences in economic motivation and to make the necessary transitions in reasoning analogously from race to race, and from one physical environment to another. The neuro-physiological equipment and the hereditary modes of response of people of different regions are similar. Differences in behavior that are due to differences in physical environment, customs and social institutions can be understood and allowances can be made. The group averages in interregional comparison do not differ greatly. These differences are not so great as is the range of variation among individuals within any one region.

The writer has had the opportunity of teaching economics to college students of different races in the Near East, and in the Middle East as well as in America and he has been impressed with the similarity of the reactions of all these students to economic doctrines, no matter from what race or region they have come. The list includes Syrians, Turks, Egyptians, Greeks, Armenians, East Indians and Americans.

The Indian and American students are far remote from each other, yet the average student of India is inclined to react to fundamental economic demands in the same ways that the average American student does. On controversial points, about the same number hold one extreme view or the other, and there is practically the same concentration on middle ground, whether one speaks of India or of America.

The "human equation" does make difficulty for one who strives for exactness in economics. But the difficulty is more potent in individual comparisons within one region than in comparisons of the average behavior of the people of one region with the average behavior of those of another region, no matter how remote from one another the two regions may be. Therefore there is no reason why comparative regional economics should not develop into a science, so far as the human element is concerned, if it proceeds along the line of quantitative comparison.

5. DIFFICULTIES OF CAUSATION NOT PECULIAR TO ECONOMICS

Apart from the complications introduced into economic science by the unreliability of human behavior, there are other perplexities

relative to causation which seem inherent in the whole range of economic research. Economists are prone to think the discovery of the exact cause of any particular result in the field of commerce or industry the most Herculean task given to man. The teaching economist is asked by the student why the price of cotton fell, and he gives an answer. He has done his best, yet he knows that his answer has been partial and incomplete, and that he may have overlooked some of the main factors that caused the price of cotton to fall. However, is not the subject of causation just as embarrassing to the teachers of other sciences? The following quotation suggests that the subject of causation might give difficulty anywhere:

"If we hear cries in an adjoining room, we might say, 'What is the cause of this disturbance?' Various answers might be given to such a question. Since what is desired is an explanation, we might say that a child has been the cause of the noise, or we might specify the physiological organs which have been instrumental in producing the outcry. Or we might say that neglect had been the cause, meaning thereby that the child's distress could have been prevented through adequate care. Or we might say that milk had been the cause, meaning that it was the object, conscious or unconscious, which was being demanded." [1]

Recollection of the difficulties which the philosophers from Aristotle down to Bertrand Russell have experienced even in defining a cause, should give the economist courage and consolation. Apart from the difficulty of definition, the discovery of the cause- and effect-relationship is the acid test in all of the sciences. Even in the "exact" sciences, where the going is supposed to be easier, often hundreds of experiments requiring the most careful measurements have had to be made in order to gain one little ray of light from one particular angle. Such consistent effort in measuring will bring results in the social sciences as well. The student of economics must guard himself against over-emphasis of the idea that his subject is an "inexact science." We too must learn of causes or else shut up shop. That comparison between regions is an important field in which there must be search for causal relations we shall now attempt to show, treating the subject from the point of view, first, of method and then of its possible fruitfulness.

6. THE ESTABLISHMENT OF CAUSAL RELATIONS IN REGIONAL COMPARISON

Mention has been made above of Mill's famous canons of the methodology of experiment in the search for causes. The first of

[1] *Introduction to Reflective Thinking*, Columbia Associates in Philosophy, 88.

these he called the Method of Agreement. He said, "If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all of the instances agree is the cause of the given phenomenon." If the same phenomenon (say, a rise in price-level) appears in America and in India, and there seems to be only one circumstance in common in the two countries then that one factor (say, an issue of government notes) is the cause of the rise in the price levels of both countries. How can we be sure that the circumstances agree in one particular only? It is not easy to be sure in either case but if the data is available, the Method of Agreement should find more frequent use when widely remote regions are compared than when the phenomenon appears twice in the same region. That is, if one factor is obviously common to both regions, it is more likely to be the only one that is strictly common if the regions are far apart.

Mill's second method was called by him the Method of Difference; he describes it as follows:

> "If an instance in which the phenomenon under investigation occurs and an instance in which it does not occur, have every circumstance in common save one, that one occurring only in the former; the circumstance in which alone the two instances differ is the effect, or the cause or an indispensable part of the cause of the phenomenon."

This means that if circumstances a, b, c, d, and e are present a certain result occurs; but if circumstances a, b, c, and d only are present and the result does not occur, then e is causally connected with the result. The Method of Difference is particularly serviceable for laboratory experiments in which the presence or absence of elements or characteristics can be controlled. In the study of economic causation the presence or absence of conditions or factors cannot usually be regulated. Furthermore, in economic life some additional factor may be present in the second series which has the power to neutralize the effect of a factor or factors which might have affected the result.

But in spite of these handicaps, the Method of Difference is useful to the economist, especially when combined with the Method of Concomitant Variations (which will be discussed later). In his efforts to discover why the productivity of some regions is so much greater than others, the economist will find this method helpful, even though he must be content to forego mathematical precision. A rather loose illustration, but one taken from life, will suggest how this method may be used in inter-regional comparison. A group of wealthy residents in India once formed a company for the

production of refined sugar. They sent one of their number to Java to study the sugar refineries of that place. He returned and established a duplicate of one of the most successful Javanese factories. Buildings, machinery and power plant were duplicated. A ready market was found in India for the output. Yet the enterprise lost money consistently. Upon investigation by an outside expert, it was found that the plant and the labor were adequate. The one thing lacking in the Indian factory which the Java factory had, was an expert manager to coördinate and synthesize the productive processes. The poorly paid and poorly qualified Indian manager was discharged, and an experienced manager was employed. With the same equipment and labor the company then began a successful career.

The limitation to the use of the Method of Difference in interregional comparisons is the lack of certainty that the situations are similar. For example, if two systems of production are placed side by side, they will possibly be dissimilar in climate and natural resource, in the efficiency of labor (especially in ability of the workmen to use complicated machinery), in the forms of capital, and in the competence of the entrepreneurs. Each agent of production in the two regions would have to be compared separately before the systems as a whole could be said to be exactly comparable. Probably it is safe to say that the more the field of comparison is narrowed, the greater is the possibility of using the Method of Difference in quantitative comparison.

Mill next outlined the Joint Method of research, which is a combination of the Method of Agreement and the Method of Difference. Without quoting his rather heavy explanation of the Joint Method, we will set it down here in symbolic form, as it is given in "An Introduction to Reflective Thinking."[1]

If, *a*, *b*, *c*, *d*, ... *R*
and *a*, *m*, *n*, *d*, ... *R*
a, *p*, *q*, *d*, ... *R*
a, *x*, *y*, *d*, ... *R*
then both *a* and *d* seem related to *R*.

But if *a*, *e*, *f*, *g*, ...
h, i, j, k, ...
a, *r*, *s*, *t*, ...
then not *a* but *d* is causally related to *R*.

[1] *Ibid.*, 77.

In those cases where more than one factor is present in the instances in which the same result occurs, it is possible to eliminate some of the common factors because it is found that in other instances in which they are present the result has not occurred.

This rather involved method is more in keeping with the complexities of economic life and seems to have possibilities as a method of arriving at a knowledge of causal relations in certain fields of research. It might well be used in the study of problems of population such as the causes of changes in immigration and emigration in different years, the causes of variations in the birth and death rates, the reasons for increases in crime, and for notable changes in the marriage rate. Mr. Gutmann gives an interesting example of the way in which this method might be used to trace to its source an epidemic of anthrax. All of the afflicted were women; but all of the women of the locality were not afflicted. Almost all of the women were employed in the same locality. Several of those attacked were employed in a brush factory, but some of the sick had never been employed there. "What we must find, if that be possible, is some circumstance common to all the cases, which distinguishes them from all persons not infected. This factor is finally found to be that they all purchased a certain cheap grade of fur which they have been wearing and which has infected them; whereas the other women of the town had nothing in common which might have been connected with the disease, save the fact that none of them had worn the furs."[1] Mr. Gutmann goes on to point out how the lines can not be drawn so strictly as in the example and how absolute precision is not to be hoped for.

In comparison of economic quantities in different regions at the same time, this method has its uses, but it must not be pushed too far. For example, the price of cotton might have advanced in America because of the boll weevil, in India because of the failure of the monsoon, and in England because the Nile failed to do its full duty. The price may have advanced in all three countries because of any one, any two or all three causes. Then, of course, there is the demand side of price determination with all of its complications. It is difficult to see how the Joint Method by itself could cope with a problem so complex.

The fourth method of experimental research outlined by Mill is the one most commonly used in economic studies. This is the Method of Concomitant Variations. It is described thus: "Whatever phenomenon varies in any manner whenever another phenomenon varies in some particular manner, is either a cause or an effect of that

[1] *Ibid.*, 82–3.

phenomenon, or is connected with it through some fact of causation."

Much of the development of modern business and economic statistics has been the result of this method. One reason why this is so is that it is often necessary, in the industrial world, to make comparisons of instances in both or all of which a particular factor is not totally absent. The solution of such problems turns on the matter of degree. Another important reason for the popularity of this method in economic research is the derivation of statistical measurements of variation and relationship.

It is not our purpose here to discuss a method so well known and so commonly used as that of Concomitant Variations. It is sufficient to call attention to the fact that this method of economic research is as profitable in inter-regional as it is in infra-regional comparisons, provided the data of the two regions can be rendered similar in methods of collection, in definition of terms, and in units that are more or less comparable. If the object of the student is merely to obtain relative percentages of change in factors in different regions, then the main sources of danger lie in the basis on which the data are collected, and the possible unreliability of the facts when gathered. Professor Henry L. Moore, who has used to great advantage the method of correlation in making comparison between regions, is of the opinion that the time has now come when statistical data are sufficiently reliable to permit the economist to develop a department of economics that may become a real complement to deduction. He says:—

"The idea which I should like to emphasize is that because of the recent development of statistical theory and the improvement in the collection of statistical data, we are now able to meet the needs so clearly described by the masters of the science." [1]

It is true that reliable statistics do exist, but they do not exist for all regions. The lack of such data is most noticeable in backward places. If we are to discover the reasons why arrested economic development exists, comparison must be drawn between these regions and others which have advanced. For example, reliable statistics of economic conditions in China and Russia do not exist. We shall not know what is happening in Russia's economic life and in what ways the Soviet Government has reacted upon the standard of living until such quantitative data is available. Statistics of some South Ameri-

[1] Henry L. Moore, *Forecasting the Yield and Price of Cotton*, 172.

can countries can be found, but often they are not reliable. It is the writer's hope and belief, however, that the time is not far distant when all governments will see the necessity of accurate measurements of the economic conditions within their jurisdiction. If the rate of advance of the last decade in this particular is maintained, such will be the case.

Mill's fifth form of experimental reasoning is called the Method of Residues and is described in these words: "Subduct from any phenomenon such part as is known by previous inductions to be the effect of certain antecedents, and the residue of the phenomenon is the effect of the remaining antecedents."

The practical application of this method is its use in accounting for the unusual. If a flurry occurs in the stock exchange, which does not appear to be accounted for by the ordinary rules of supply and demand, the spectator, if he is interested in the cause, will look for some factor not previously observed which might account for the unusual excitement. If he is experienced in stock exchange transactions, he may conclude from previous experience that a clique of "bears" or "bulls" (as the case may be) is operating with the intention of affecting the price. He will look for evidence to substantiate this hypothesis. If he is not familiar with the exchange beyond having a general knowledge of the principles according to which it is supposed to operate, he will have to search for evidence that might suggest to him an explanation of the phenomenon he has observed. He will, therefore, look for some extraordinary circumstance or condition to account for an unusual phenomenon, and when this is found, he will conclude for experimental purposes that there is a causal connection between the two.

Science assumes that a law is universal in its application. There is not a separate science of economics for Japan and another for New Zealand; one for United States and another for India. If this is true, it should not be considered bad judgment to assume that the forces of demand and supply operate in India as they do in this country. It is probable that the American flapper and the Buddhist priest have more economic similarities than dissimilarities. The known and familiar then become to us a standard by which we pass upon the economic phenomena of foreign countries. By applying these laws that seem to operate at home we are led to search for the causes of differences in the economic manifestations abroad. Quantitative measurement, history, and a knowledge of conditions must assist us, and even then of course the task is difficult. But the stakes are great: the welfare of many may depend upon reforms

carried out along right lines. This application of the Method of Residues does not demand omniscience on the part of the economist. The planet Neptune was discovered by using this form of reasoning as a starter, and afterwards its existence was proved by other tests. The Method of Residues in comparative regional economics may suggest an explanation of difference, and other methods may be used to test out the strength of the assumption; as for example, multiple correlation, which "begins with concrete reality in all of its natural complexity and proceeds to segregate the important factors, to measure their relative strength, and to ascertain the laws according to which they produce their joint effect."[1]

7. CONCLUSION AND SUMMARY

If Mill's five famous canons for experimental research are applicable to inter-regional comparisons as well as to comparisons in the same place at different times, why should the comparison of place with place be neglected? Both are needed.

In time, such study should yield norms or standards for production and consumption which would apply (with necessary modifications) to different regions for various industries. The corrections necessary would be influenced mainly by the human factor, especially in the field of labor and its efficiency. The amount of skilled labor used in United States to every $10,000 of capital varies from plant to plant and from industry to industry. But in some of the best organized plants, as in the steel mills, we now have sufficient cost figures and production totals to estimate fairly accurately what is the proper balance between given numbers of skilled and unskilled laborers and amounts of raw material and investments in plants and machines. Less of one factor and more of another would increase the cost per unit. As production of steel is not static but dynamic, changes must be made from time to time in the amount of each factor employed. But each plant or combination of plants has learned this rough balance of factors by costly experience. The knowledge gained by each firm within the industry is not regarded as a standard which is available for other plants outside the individual business organization. Socially, there has been no formulation of the ratios of the different factors of production to each other. That any one factory operates smoothly with a satisfactory balance of factors is ascribed to the wisdom and ability of the executives in charge. The profits which are due to this ability are called by the economist the "wages of management." Our complaint is not that the able

[1] H. L. Moore, *ibid.*, 173.

manager receives a high salary, but that in the whole field of industry, the wasteage is so great because each infant industry in each region must, by trial and error, find out for itself that combination of factors which will achieve the best results.

With the improvements in cost accounting and in the index numbers of production, we should now be able to arrive at principles or standards which would be applicable not only to industries within the same region, but could be applied to other regions far distant. The experience of the economically advanced regions has not been made sufficiently concrete so that it can be applied to regions which are backward. It is not enough to say that conditions are so different that the concreted experience of Europe and America could not be applied, say, to India and China. It is these elements of regional difference with which we are concerned and they may assist in finding the truth.

Why do the differences exist, and along what lines should betterment be encouraged? The goal of economic study is human satisfactions. The science of economics has its contribution to make to civilization. The criteria of progress include possessions. In the words of Lord Asquith, "The test of every civilization is the point below which the weakest and the most unfortunate are allowed to fall." Professor Ogburn in his book *Social Change* explains progress not on the basis of a changing human nature but as a function of an ever rising and widening base of human knowledge and culture. Inventions and discoveries appear at approximately the same time in widely separated regions. He says that "the social heritage of a particular people also grows through the adopting of a portion of culture in use by some other people." He speaks of the spread of culture as "diffusion," "which is known to occur when contacts are rare and distances great." This is doubtless true of inventions and scientific discoveries but, the contributions which the economist has made to human culture have not been diffused rapidly from their place of origin to other regions far remote.

The economist of to-day finds himself face to face with the problem of the inequalities of standards of living in different regions. For example, India and China have not participated in the economic progress which has become conspicuous in some of the western countries. Many explanations have been offered for the economic backwardness of regions in Asia, Africa and South America. Which explanation is nearest the truth? We do not know. It is time that we were finding out. Scientific comparison seems the most obvious method. The standards of living of such countries as India and

China are considered low *relative* to those of other countries. Comparison is connoted in a mere statement of the facts—a contrast of *effects*. What is now required is a thorough-going search for the *causes* of the differences in real incomes in separate regions. Doubtless there is not one cause, but a number of interacting causes. And so far no adequate effort has been made to measure the importance and relative strength of those forces which have been responsible. Because we understand so imperfectly what the quantitive criteria for economic progress are, we cannot measure the degree to which such countries as India and China lack them.

To summarize briefly the argument of this paper: the next ten years will bring still greater efforts to measure quantitatively and to interpret the economic factors which determine human welfare. The economic world is so rapidly becoming more unified that no part of it can afford to neglect the study of the economic conditions of other parts. The economist should not restrict his interest to his own country or to any section thereof. A very important aspect of economic study has been to some degree neglected: the comparison of the economic factors operating in different regions. Their very differences may be illuminating. Inter-regional comparison conforms in a general way to the same methods of experimental research used in infra-regional comparison. It is more difficult because more complex but it is far from being impossible. Inter-regional comparison is becoming more possible each year with the advances in the technique of collecting quantitative data and in the refinements of statistical measurements. Such research should yield standards or principles of economic progress which would greatly assist the backward regions of the earth in their struggle to pass from indigence to comfort.

FUNCTIONAL ECONOMICS

by

ALBERT BENEDICT WOLFE

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FUNCTIONAL ECONOMICS

1. THE DEMAND FOR A SCIENTIFIC ECONOMICS

By far the greater number of the younger generation of economists are absorbed in business economics and the special problems of organization and control arising from the current politico-economic situation. They are in the main very highly specialized teachers or investigators, without much opportunity to follow up such interest as they may some time have had in the theoretical problems of general economics and its methods of thought and research. Whether this specialization is from personal choice or in answer to the demand for specialized experts in specific narrow fields, the result is that but comparatively few men are devoting their energies to the advancement of economic theory, and that a still smaller proportion of university students in economics feel it worth while to make any very extended study of the problems involved in an attempt to arrive at a philosophical, or scientific, and systematized knowledge of economic life as a whole.

A small minority, apparently increasing, still carries forward the older philosophical tradition, however, and retains an interest in economics, not as a loose collection of "applied" problems of the day, but as a systematized body of doctrine which seeks to explain economic phenomena in general and to clarify and deepen our understanding of them. The members of this minority seem to be in cordial agreement among themselves on one matter only. They are all convinced that the older economic theory, current in journal literature to within a decade, and still standard in most economic treatises and texts, is in need of thorough renovation and reconstruction, even if it should not prove necessary to tear it away altogether and erect an entirely new structure of theory in its place. With of course notable differences of emphasis and degree of revolt from the traditions of theory, whether classical or marginalistic, they are in substantial accord in the conviction that the older economics is inadequate to meet the standards set by modern scientific ideals of objectivity, realism, and freedom from metaphysical preconceptions. The older body of doctrine, it is charged, is static and taxonomic, *a*

priori and deductive, unrealistic, scholastically over-refined, and based on an antiquated and unscientific psychology, instead of what a valid body of doctrine must be, namely, dynamic, evolutionary and relative, concerned broadly and objectively with processes rather than with the precise implications of conceptual definitions, scientifically inductive rather than formalistically logical in method, and realistic in that its generalizations pertain to and are derived from actualities rather than metaphysical postulates and hypotheses.

Having in mind the American literature only, we may safely say that most of the noteworthy theoretical work by the younger economists in the past decade has been in the nature of destructive criticism. That some of this criticism is as metaphysically scholastic as anything the classicists or marginalists can be accused of, and that some of it reveals the lack of a fair appreciation of possibly permanently valid elements in the older theory, even in the much reviled economic hedonism, need not concern us at this point. The patent fact is that we have entered and are well along in one of those recurrent periods of iconoclastic criticism which have marked the history of all philosophy and of economic theory in particular, and that comparatively little positive, constructive work of a broad nature has yet been done by the younger theorists. At least this would seem to be true unless we count the necessary work of adverse criticism, and the lively interest in methodology, constructive. When it comes to constructive theory, either as to economic principles or as to methods of research and analysis, we find little clear agreement.

The points of disagreement among the insurgents are striking and important. Some of them hold that economics cannot be objective and scientific unless it is pursued as a pure science; others that it would be a useless academic amusement if it were. Some say that economics must be based on a scientific (as opposed to the associational-hedonistic) psychology; others that a scientific psychology, if possible at all, is not as yet in existence, and that the economist must get along without psychological data—which means that he cannot admit any consideration of motives into his analysis. Some say that economics must be a study of the functional processes of creating and advancing human welfare, to the extent that welfare is related to the production, distribution, and consumption of material goods and services, and hence that a close relation between economics and ethics must be recognized; others hold that economics proper has nothing to do with welfare, but is concerned only with the mechanics of the price and market process, and exhibit an almost morbid fear lest scientific "objectivity" be contaminated by ethical interest. The main issues

among the younger methodologists thus reduce to three, namely: pure science versus purposeful science, mechanical description versus psychological (or behavioristic) explanation, price economics versus welfare economics.

But whatever the differences between them, practically all the younger men hold that economics ought to be scientific. No thread of assumption runs more clearly through the journal literature on theoretical methodology than the assumption that the main work of the oncoming generation of economic theorists is to erect a scientific structure in the place of the philosophical one bequeathed to us by the long line of builders from Adam Smith to Marshall, Böhm-Bawerk, Taussig, Clark, *et al.*

Now whatever may be the vagaries to be detected in this growing demand for a realistic, inductively analytical, non-metaphysical, scientific economics, it is at once a sign of healthy mental activity in line with what Veblen calls the matter-of-fact spirit of the times, and evidence of profound revolt from hitherto authentic and accepted methodological procedure. The most immediate cause for the development of the demand for a scientific economics is undoubtedly to be found in the growing conviction that the older economic theory, whether classical, neo-classical, or marginalistic, is deficient in scientific quality.

It is unnecessary to go into the catalogue of charges. Practically, the revolt from classicism and marginalism probably results from something much more specific than dissatisfaction with the hedonistic-associational psychology which is alleged to have been the consciously adhered-to psychological foundation of the older schools. While the classical economists in the by and large were probably more liberally educated men than the average run of our present output of economic doctors of philosophy, in this day of business economics and intensive specialization, it may be doubted whether they were all so consciously logical in their addiction to a particular type of psychology as some recent writers would have them.[1] And it may be doubted whether familiarity with psychological and philosophical theory is so common among the younger generation of economists as to occasion in each of them a consciously directed revolt against associationism and hedonism. In fact it is doubtful whether, excluding the small group of theorists avowedly interested in methodology, any very large percentage of the younger men could give a satisfactory account of the meaning and content of these two much-abused bodies of doctrine.

[1] Notably Boucke, *A Critique of Economics*, 1922, ch. 1.

A more immediate cause for revolt than the discrepancy between our psychology and that of James Mill has been the endless and useless scholastic refinements in value theory which certain English and American economists of international repute have inflicted upon us. In a matter-of-fact age, keen for knowledge individually or socially useful, and impatient of philosophy and formal logic, it was a foregone conclusion that the refined scholasticism characteristic of many of the writers in the psychological and price-economics schools would contribute to the killing of interest in "theory." The demand for a scientific economics is most certainly a demand for a realistic economics, a "dynamic" body of theory derived from and fitting actual economic phenomena rather than the taxonomic conceptions of formal logicians, who can write rejoinders and re-rejoinders to the end of the chapter without settling anything of prime import to the practical job of securing an efficient economic society.

Certain other impulses, classifiable as moral as well as scientific, have been active. Dissatisfaction alike with the apologetics of the classicists and marginalists and the doctrinaire militancy of the socialists has impelled many to seek for more objective theory. There has been specifically adverse reaction against the persistent assumption of old-line theory that free competition is the basis of our actual economic organization, and still more against the postulate, implicit in all orthodox economics since Adam Smith, but most explicitly expounded in the writings of J. B. Clark, that free competition is the "natural" norm of economic relations. In this rejection of a meta-physical state of nature and "natural law" the economists, like the theoretical jurists, are belatedly following the wake of the philosophers.

Certain more general influences should also be noted. The natural sciences have developed constantly in prestige, and the "men of science" have not always taken sufficient pains to conceal the sense of superiority felt by the man who knows what he is talking about over the man who does not; and the economists evidently do not, because, as we are frequently reminded, "no two economists agree on anything." The younger economists, not having developed fully pachydermous hides, are more sensitive to this sort of thing. It was inevitable, also, that standards of scientific objectivity and accuracy (How frequently does some young economist tell us that all science is measurement?) developed in the natural sciences should be imported through analogy and emulation into the field of economic methodology. The discussions of methodology and the special limitations and modifications of scientific method in the field of sociology,

dull, inconsequential, and long-winded as many of these discussions have been, have perhaps had some influence. More probably the main extraneous impetus to renewed interest in economic methodology has come through students familiar with the very lively discussions of scientific method, and the relations between science and philosophy, which have occupied some of the best philosophical minds of the time.

A still more general influence has been the permeation of all modern thought by evolutionary concepts and the growing habit of thinking in dynamic, evolutionary terms, rather than those of statics, final and metaphysical "natural" states of society, and the like.

Whether this "matter-of-fact" type of thought and sentiment is as directly attributable to the growth of the machine process in industrial life as Veblen thinks it is may be open to question, but it cannot be doubted that in every phase of social endeavor (though we have perforce to exclude from this statement the so-called "fundamentalists" and one-hundred-percenters who are dogmatically fighting "evolution" and "radicalism") the passage of time witnesses a rapid spread of the tendency to form opinion and to settle public issues on the basis of factual investigation rather than on the basis of the older amenities of rumor, party dogmatism, uncritical tradition, and guesswork.

In spite of these credentials which the demand for a scientific economics can show, and in spite of, or rather because of, a personal desire to face life frankly, to face facts rather than fall victim to poses and illusions, the cautious individual will join exuberantly in this chorus of demand that economics be "scientific" only after he is reasonably sure what is meant by "scientific." The plea of scientific caution will excuse one if one cannot help occasionally entertaining the suspicion that "scientific," like "democracy" and "American," is becoming a shibbolethic password which the naïve think they have only to pronounce with sufficient glibness to be welcomed among the respectable and recognized elect. It may mean anything or nothing, in the absence of specifications.

"Scientific" may refer either to the mental timbre and attitude of the investigator, to the type of method he uses, or to his purposes in undertaking research at all.

This is no place for an exposition of the scientific method, but certain observations with regard to it are necessary, if misunderstanding of the argument which follows in favor of a functional and ethical economics is to be avoided. Every one will admit that the scientific method is a factual method, that is, that its generalizations are derived primarily through inductive inference from observed facts.

If we try to imagine how a mind of superhuman power and reach, but normal so far as the logical processes of its thought are concerned, and accepting, broadly speaking, the conceptual ideas thus far developed by man—concepts being essential to the most elementary thought,—would use the scientific method, the process would be as follows: First, all facts would be observed and recorded, *without selection* or *a priori* guess as to their relative importance. Secondly, the observed and recorded facts would be analyzed, compared, and classified, *without hypothesis or postulates* other than those necessarily involved in the logic of thought. Third, from this analysis of the facts generalization would be inductively drawn as to the relations, classificatory or causal, between them. Fourth, further research would be deductive as well as inductive, employing inference from previously established generalizations.

The scientific method as it has actually to be used by the limited human mind involves a greatly modified procedure. Still basically factual or empirical, it necessarily involves great use of scientific imagination, hypothesis, and selective observation. Theoretically, if one accept the determinism essential to a scientific attitude, every part of the universe affects every other part; I cannot wiggle my little finger without perturbing the motion of the planet Jupiter. Actually we have to limit our observations and calculations to a relatively very small body of factual data assumed to be, or found from some previous observant experience to be, in significant coexistential or sequential relation with the phenomena under investigation. In other words we have to select the type of facts to be observed and recorded. Moreover, since we cannot know with certainty beforehand exactly what types of fact are, or are not, significant for our problem, we have to make our selection on some working hypothesis. This means that in a measure we try to anticipate by deductive inference from previous scientific work, from a trial and error method, or from more or less shrewd imagination ("intuition," "hunch") what the significant facts will be found to be.

Now in the selection of factual data and in the use of hypotheses, scientific objectivity, objective honesty, or whatever we wish to call it, requires us to select our facts "objectively," that is, without regard whether the conclusions they force us to draw are agreeable to us or not. The same holds true, even more evidently, of deductive processes and of such conjectural inference (in the absence of adequate factual data) as we may allow ourselves.

The features of scientific method which it is desirable to emphasize in a discussion of economic methodology, therefore, are the following:

(1) Unbiased selection, without undue limitation of range, of factual data. The meaning of the term "unbiased" might be discussed at length. Let it suffice to say that it means in the main freedom from personal or class interest, from dogmatic egotism (assuming that one's ideas are more valid than the next man's simply because they are one's own), from metaphysical presuppositions, and from any desire either to condemn or to praise the facts as they are, and consequently without any desire to make them appear to be what they are not. (2) Hypotheses always remembered to be what they are, devices in a trial and error method. (3) All generalizations regarded as tentative, relative to the data from which they are derived, and accepted as true only "so far as we know." (4) Deductive inferences and conclusions frequently tested by repeated appeal to experience (facts, reality), and long trains of linear logic (syllogistic reasoning from "fundamental postulates") avoided as likely to lead, if not to erroneous, at least to insignificant conclusions.

These four characteristics may be illustrated, in query form, by reference to the method of the classical economists. (1) Did they, or did they not, select their facts under the bias of desire to uphold the capitalistic price system—the apologetic bias so cogently charged against them by Veblen and others. On the other hand is, or is not, the Veblenian selection of facts made under the opposite pre-conviction that the capitalistic price system is in the main a vested-interest mechanism for predatory acquisition? (2) Did the classical economists start from individualistic hedonism and universal free competition as hypotheses, and then forgetfully treat them as fundamental, established postulates, or as generalizations supported by factual evidence, or did they not? Do the neo-classicists and marginalists think they are dealing with factual realities in their long theorizings on competitive price? (3) Do conservative economists still regard the generalizations of competitive price economics as essentially final and universal in validity, or do they regard them as "relative"—convenient shorthand descriptions of a given stage in a dynamic process of economic evolution? If so, why so much criticism of the historical school? (4) How much progress have classical, neo-classical and marginalist price economists made over the Ricardian method, when it comes to checking the results of deductive logic by appeal to fact?[1] Without expressing or implying an opinion on these points, we may remark in passing that the revolt against the linear logic of classical method, and the advocacy of an inductive, factual, statistical

[1] Cf. J. H. Hollander, "Economic Theorizing and Scientific Progress," *Amer. Econ. Rev., Supp.* March 1916, 124–39.

method, however laborious and slow to produce results in generalization or policy, are quite as strong as is the dissatisfaction expressed over the apologetic attitude of the old-line economists, either by those who desire the colorless objectivity of pure science or those who are already convinced that the present system is unethical.

As to the second possible implication of the demand that economics be "scientific," namely that with regard to attitude, little need be said. The person characterized by scientific attitude is objective, observant, attentive, curious, informed, patient, sceptical (but not subjectively or egotistically so), open-minded, critical (both of premises and of logical processes), cautious, deterministic, and, as is implied in the term objective, free from metaphysics, personal interest, and class bias. No one interested in the discovery and spread of truth can be otherwise than wholly desirous that every investigator, in whatever field of research, should have these qualities.

It is when we come to the question of the purposes which can legitimately motivate scientific research that sharper difference of opinion commonly finds expression. Here it is possible to distinguish three different theories: (1) the pure science ideal, which rules out any purpose other than "discovery of truth," (2) the ideal of complete objectivity in research processes, but with admission that research may be directed to matters or problems in which there is ethical or practical interest, (3) research undertaken from ethical motives as well as from intellectual curiosity, and with some fundamental ethical norm or standard in mind. Most theorists would probably adhere to the second of these ideals; a few in theory, but hardly in practice, to the first; while the third, which is the one I mean to uphold, is likely to be regarded with some misgiving, if not rejected without a hearing.

2. THE PURE SCIENCE IDEA

According to the "pure science" idea, economics is to be the virgin pursuit of knowledge for its own sake. Any practical application or ethical value it may chance to have will be in the nature of an immaculate conception. Such an idea has only to be stated to reveal its empty formalism and its violation of the most elementary principle of economy. No economist, unless it be one or two in the pure mathematics group, has ever lived up to it, and it is exceedingly doubtful if any one will. To abide by it we should have to be able totally to divorce our intellectual interests from our ethical and practical—more than that, from the whole *Zeitgeist* of the society in which we live. We should have to be able to have just as keen an interest and industry in a research which gave promise of having not the slightest

utility beyond satisfying our own vagaries of curiosity as we could have in collecting the data and working out a system of theory essential to the solution of some great human problem. Now it is true that one can find in economic literature some writings which suggest that their authors had got lost in the intellectual pleasures of scholastic metaphysics and the beauties of logical systems with only the most tenuous connection with realities. This seems an indication of the pure science spirit; but in most of these cases the author's own assumption is that he is dealing with reality, with something socially worth while, and is not merely amusing his own curiosity and satisfying his own aesthetic pleasure in mental construction. The vast bulk of economic research and thinking has had to do with very present problems and issues.

The "instinct of workmanship," or "creative impulse," and satisfaction in an intellectually created product, regardless of its utility, are doubtless present in any voluntarily undertaken intellectual work. Intellectual curiosity, pure and simple, has been a powerful motive to research in the natural science fields. But it has by no means been the only motive, and perhaps rarely the chief. A survey of the history of natural science will show how influential other purposes have been: for instance, desire to transmute the baser metals into gold, to find a sea route to India, to provide astronomical and meteorological knowledge applicable in the art of navigation, to advance the art of medicine, to free man from the tyranny and dogmatic traditionalism of the church. Those who assume that "the division of labor between pure science and application has become an established tradition"[1] can hardly have taken full account of the enormous mass of scientific output which comes as the direct result of research supported and undertaken with very definite utilitarian ends in view. The Geological Survey, the Naval Observatory, the Bureau of Standards, and the various research bureaus in the Department of Agriculture, to mention only a few government research organizations, the research units of the great medical foundations, and the great industrial corporation laboratories, are all engaged in research, not to satisfy the love of pure science, but to advance knowledge applicable in the solution of actual problems. Yet their contribution to pure science is surely not negligible. Moreover it is not to be supposed that the

[1] F. H. Knight, *Amer. Econ. Rev., Supp.* March 1922, 192. Knight points out, however (193), that "the complete division of labor which we find in the natural sciences between one set of workers carrying on research and another set making the results of research effective simply cannot be realized in the social science field."

natural science laboratories of the universities are influenced, in their choice of research subjects, by the practical demands of the time.

The chief objection to the pure science ideal, for economics, lies not so much in the practical impossibility of such a segregation of the intellectual and the ethical or practical interests as it would require, as in its lack of economy of effort. Followed out literally, it would reduce economics to the status of an intellectual indoor sport, any utility of which, aside from gratifying the esthetic sentiments of its devotees, would be fortuitous and accidental. It is difficult to see why the tax-paying public or even the wealthy donors of endowments for universities and bureaus of economic research should feel called upon to support it. In a world so sick, economically, politically, and psychologically, as ours is to-day, it is difficult to be patient with the lofty idealism of those who affect the pure science idea. It is not necessary to assume that civilization is going to pieces, although it seems to be pretty well up on the rocks, but in a society with so many and so great problems, pressing for the earliest possible solution, as now confront us, what we need to seek is not *any* truth, but significant truth, and significant truth is that which will help solve these actual problems. This is no time for detached academics, unless the academician can give clear evidence that out of his detachment something of real social utility will come. If there ever was a period when economists needed to apologize for being practical and having ethical purposes, this is not such a time.

How far the pure science ideal is from actualities, and how revolutionary of attitude and method it would be, were it to be taken seriously, must be clear to anyone who thinks over the characteristics and temperament of the classical and the contemporary American economists.

However much their methodological writings have emphasized the need for objective method and detachment, and counsels of this kind are by no means limited to the writings of the younger men, economists have always been interested in practical issues, upon which theory was supposed to throw the light of "principles," far more than in pure theory for its own sake. I shall say nothing at this point of the ethical background of classical economics. Whatever their ethical and psychological preconceptions, their theory tended to center upon matters which were of paramount practical interest at the time. None of them—not excepting even Jevons—was, so far as I can see, actuated wholly by the pure science motive. It is only necessary to mention Adam Smith and free trade; Ricardo, the corn laws, and the bullion

question;[1] Malthus, the poor laws, and revolutionary radicalism; Cairnes, the wages fund, and trade unionism. If the earlier English classicists were not altogether conscious of this relativity, and if, in consequence of their much criticized insularity, they wrote as if the principles which they had derived from their cogitations upon the specific economic issues in the England of their time were natural laws, valid universally, that may be attributed in part to their philosophical background, and in part to the fact that the evolutionary mode of thought had not yet become common. Most of them were actively interested, as are our leading economists at present, in specific social and economic problems. If we are tempted to think of Jevons, for instance, as a pure theorist, working out a quasi-mathematical theory of value, we have only to remember his *Coal Question* and his *Studies in Currency and Finance*. And if we find that economists in other countries did not always agree with the conclusions of the Englishmen, that is, in some cases at least, additional proof that interest and thought grew out of other conditions and problems than the English had to face. It certainly was not abstract logic or pure scientific interest that led List in Germany to reject the free trade doctrine and Carey in the United States to reject both free trade and the Ricardian theory of rent. "Each generation of economists," as J. M. Clark says, "succeeds to a new assortment of practical problems to which its doctrines are to be applied."[2] Sometimes, it may be added, new doctrines help to make new issues. If we reject the pure science ideal of an economic theory *in vacuo*, and agree with Clark that "economic theory should be relative to the issues of the time,"[3] we shall have to admit, I think, that taking them by and large, the classicists, down to Cairnes, lived up to this standard pretty well. Later, it is true, the functional and practical trend which characterized classical economics, in spite of its doctrinaire hedonism and its deductive method, was greatly diluted, in the doctrinal controversies which developed when the Austrian school appeared on the scene, and reached its weakest state in the American psychological school. Nevertheless even in the interminable flow of disquisitions on value, subjective and otherwise, which the Austrians

1 As to Ricardo, reference may be made to Leslie Stephen, *The English Utilitarians*, 1900, II, 261ff.; Hollander, "David Ricardo, a Centenary Estimate," *Johns Hopkins Studies in History and Political Science*, Series XXVIII, No. 4, 1910; Cannan, *Theories of Production and Distribution*, 3d edition, 1917, 383.

2 "Economic Theory in an Era of Social Readjustment," *Amer. Econ. Rev., Supp.*, March 1919, 284.

3 *Ibid.*, 280.

stimulated, an initial practical interest may be detected. "Abstinence," which had been quietly at rest since Senior, was resurrected under the new euphemisms, "waiting," "perspective diminution," "time value," and "impatience," to do service against the attractive sophistries of the socialists. Böhm-Bawerk went to considerable pains to write a monograph showing up the inconsistencies of Marx's theory of surplus value.[1] Was this simply one of the amenities so common between pure scientists, or did it result from the desire to put a quietus upon a dangerously subversive doctrine?

Turning to contemporary American economists of national and international reputation, it is notable that even those who are recognized primarily for their work in theory have been by no means pure scientists, without lively interest in ethical and practical issues. Fetter, perhaps the most conspicuous representative of the psychological school, if such it may be called, is avowedly interested in practical welfare economics. Fisher, another economist who has inflicted upon us some most doctrinaire theory, enjoys international fame, far more, probably, as a result of his studies in the value of money than of his hedonistic "impatience" theory; and he is popularly known for his interest in public health and eugenics. Alvin S. Johnson found pure theory, in which he certainly was not without facility, so unsatisfying that he took to journalism with a purpose. Davenport, who is perhaps the most uncompromising of price economists, and strives with considerable success to maintain a cold blooded attitude, does so only at the cost of the most severe self-repression. One has only to read the last chapter of his *Economics of Enterprise* to find revealed a soul actuated by the most intense ethical interests, not to say by something akin to anger at the inefficiencies and stupidities of the present system he has so minutely dissected.[2] Carver, with his "balanced" economic system and his frank concern for national efficiency as surety for survival in that struggle for existence which is his sociological obsession, certainly has a practical purpose back of his logic. John B. Clark, having settled in his own mind that reward according to imputed product is the just ethical norm of distribution, proceeds to convince himself, and to try to convince us, that free competition is the "natural," necessary condition for realization of this norm; and proceeds to "the control of monopoly" not as an interesting problem for the disinterested by-stander, but as a living issue which must be solved if the "natural" ethical norm is to be

[1] *Karl Marx and the Close of His System.*

[2] See also his "Wage Theory and Theories," *Quart. Jour. Econ.*, February 1919.

approximated. Standard treatises, like those of Taussig, Ely, Seager, and Seligman, while always marked by caution and moderation of expression, make little attempt to avoid expression of opinion on matters of policy, even where policy may involve a conflict of ethical valuations.

If any further evidence were needed that the recognized economists, whatever they have said about methodology, have been strangely oblivious of the alleged necessity of "purity" of thought and segregation of economics from any suggestion of ethical valuations, especially at those moments when one would suppose them to be concerned with the deeper and more significant aspects of economics, we may turn to the presidential addresses before the American Economic Association, from its earliest years to the present time. Very few of these addresses would pass muster as pure science.[1] Most of these addresses show that the then President of the Association was frankly cognizant of the fact that economics is expected to have a demonstrable connection with public life and issues, and not a few of them deal frankly with ethical matters.[2]

The pure-science advocates, themselves, do not stick valiantly to their guns. We find them referring, very illogically, to the purpose or function of economic theory in relation to social policy. We find them, like the natural scientists, selecting just those fields of research which have patent relation to contemporary practical problems—live issues. They are doubtless conscious of the fact that any young economist who takes the lofty philosophical attitude that *he*, at least, is not going to be influenced, in his choice of subjects of research, by considerations of utilitarian results must resign himself to the thought that any monograph or ponderous volume he may find a publisher for will stand more than an even chance of taking its place on the top shelves of our libraries, along with those others already there—things we will read when we get time. No one but the fellow who gloats over his collection of his own reprints can long endure a thought like that.

They are, in fact, as much interested either in business or in ethics as anybody, and so they virtually plead guilty to a dual personality.

[1] Among those which might are: Dewey, "Observation in Economics," 1909; Willcox, "The Apportionment of Representatives," 1915.

[2] For instance: Hadley, "Economic Theory and Political Morality," 1899; Taussig, "The Love of Wealth and the Public Service," 1905; Jenks, "The Modern Standard of Business Honor," 1906; Fetter, "Population or Prosperity," 1912; Carver, "The National Point of View in Economics," 1916; Fisher, "Economists in Public Service," 1918; Hollander, "The Economist's Spiral," 1921.

This they seek to justify by a doubtful expedient in the way of defining economics to suit themselves and themselves as the only genuine economists.

In order to justify their contention for pure science and at the same time avoid the charge that they would rob economics of any functional value, they reduce economics to a purely descriptive science, and hand over its functional and constructive phases to the sociologist or social philosopher. W. I. King, for instance, declares that "economics is a mathematical science dealing with the relationship between a certain class of causes and their effects, and deals wholly with what is and not with what ought to be," and hence that "we should not be too ready to condemn the economist who prefers to be an economist pure and simple, or even one who has no desire to make any practical use of the principles which he works out."[1] Kleene, in the same round table discussion of the relation between ethics and economics, coined the aphorism that "the economist should be ethical, but not his science," and averred that "the constructive efforts of 'welfare economics' lie mostly beyond the scope of economics . . . and . . . had best be named social philosophy."[2]

One man has as good a right to define economics as another, and in spite of definitions both may be actuated by practically the same purposes and contribute to the same ultimate constructional ends. What King means to intimate, I take it, is that as a "pure" economist he prefers to devote his energies to statistical investigation of the actual distribution of wealth and income, say, and leave to others the development of a constructive, critical theory as to the human and social significance of this actual distribution, since that significance certainly cannot be analyzed without going into the dread field of "ethical norms." He should realize however that when he defines economics as a mathematical (statistical?) science dealing wholly with what is and not with what ought to be, he reads out of court nearly all the men who have honestly thought they were economists. So does Kleene when he says that welfare economics is social philosophy.

The advocates of the pure science ideal must assuredly realize that everyone is interested in one way or another in ethics, that either from open-minded ethical conviction or from personal material interest, some men will continue to stand up for the present economic system, that others will try to change it, that a long drawn out issue between economic conservatives and economic radicals is unavoidable,

[1] *Amer. Econ. Rev., Supp.*, March 1922, 200, 201.
[2] *Ibid.*, 197.

and that it will be compromised from time to time—we can hardly hope that it will ever be "settled"—either on the basis of force and sentiment or on that of inductive evidence and a nearer agreement as to what sort of society we want.

Someone is going to attempt the task of constructing a factually supported theory as a guide to rationally directed social, or economic, evolution, toward an organization more effectively serviceable to worthy human ends than the one we now have. The sociologists think they are the ones to do this. And at the very time when economists pretend to shy off from ethics, the ethicists are writing textbooks which contain much economics. If then the economists, who ought to know something about economic processes and relations as functions of human life, were to take the position that there is nothing functional about their purposes, and that it is "up to" somebody else to "apply" the descriptive data they furnish, they would simply turn over to the ethicists and the reviled sociologists the task of judging (say) between business economics (acquisitive economy) on the one side and national economy (*vide* Carver) or social economy on the other. This means that the ethicists and sociologists would have to be economists, and that the economist of the pure science variety would be reduced to the position of a descriptive expert whose only service would be to supply factual data on which others would decide the questions of real interest and import—the questions of economy and efficiency in the broad, fundamental sense.

If you prefer, with Kleene and King, to restrict the term economics to a systematic but colorless description of the actual economic system, there is no logical reason at once apparent (though further thought may reveal one) why you should not. Only, if it is to be colorless, the description must be in terms which avoid the remotest suggestion of ethical appraisal. Some other price economists have pretended to aspire to this colorless objectivity, but their texts have either shown considerable trace of apologetic tint or have wound up with more or less scathing criticism, in an ethical vein, of the price system they have so objectively described. Which only goes to show that Kleene's ideal of an ethical economist writing a non-ethical economics is not a very practical one. The attempted restriction of the function of economics to factual description does not work out in practice, and if it did it would be unacceptable as a definition, because it mistakes a part for the whole—the data of economics for economics.

The demand for a pure science economics is not to be taken literally or too seriously. It is clear, as Tugwell remarks, that "not many

economists do more than lip service to this attitude."[1] Viner senses the situation correctly when he says that "regardless of how vociferous the economist may be in his methodological discussions of the need of 'purification' of his science, in his practice he continues to strain every effort to make it socially useful."[2]

All the pure science advocates really want is scientific objectivity, freedom from "slants," from personal, business, or class interest, from the sentimentalism supposedly always attached to ethics. There can be little doubt that the main source of their overemphasis is a certain weariness with the "indictment" complex present in all socialists and the apologetic sentiment common to all orthodox economics. A pure science economics would be only a species of the genus science for science's sake, sister of art for art's sake, and offspring of that most futile of all academic futilities, scholarship for scholarship's sake. A cynical recluse may adopt such an ideal, but no red-blooded scholar will. If the pure science economists really mean that economic research has no purpose than discovery of truth, any truth which can be called economic, I, for one, record sharp dissent, but if they mean a man-from-Missouri attitude and a first-get-your-facts method, everyone who has any insight into the function of scientific method will be with them.

3. SCIENTIFIC OBJECTIVITY WITH PRACTICAL AND ETHICAL OBJECTIVES

The second theory of scientific purpose noted above (page 452) recognizes the validity, if not the inevitability, of ethical or practical motives to research, but insists on strict objectivity in the research itself. This is the position which the pure scientists shy off from, because they think the purpose will inevitably bias the observation and the logical analysis. It is the position they really come back to in their theory of the ethical, public spirited economist devoted to an utterly non-ethical economics.

It must be admitted that this ideal of research is more exacting than that of the pure scientist, if the latter were possible in economics. It is not possible, because one cannot so completely bifurcate the personality or so rigidly compartmentize the mind as the pure science theory would necessarily require. It is on the whole more honest and safer to recognize the presence of ethical or practical impulses and sentiments and face frankly and courageously the task

[1] "Human Nature in Economic Theory," *Jour. Pol. Econ.*, xxx, June 1922, 341.

[2] *Amer. Econ. Rev., Supp.*, xii, 199, Mar. 1922. See also Professor Hollander's presidential address, "The Economist's Spiral," *Amer. Econ. Rev.*, xii, 1–21, Mar. 1922.

of maintaining objectivity in the processes of research, whatever the purpose for which it is undertaken.

We have at best a limited amount of developed scientific capacity, and an inadequate supply of men and women suited by training and temperament to objective scientific research; simple economy demands that we utilize this capacity in a way to give the largest results. This means that economists, as well as other social scientists, ought to direct their energies to lines of research which give promise of valuable social results. The motive to research should be utilitarian. This does not mean that the social scientist may not have to go far back to fundamentals, to theoretical matters which the popular mind would pronounce useless. Moreover, decision as to what is important as a "practical problem" will not be left entirely to the man of the street. The objective scientist will have something to say as to the relative importance of the matters calling for investigation.[1]

Since ethical or practical interest constitutes the main motive of most economic research, we need dwell on the subject no further than to say such motivation does not necessarily imply that the investigator takes into the research, or carries through it, any particular ethical norm, to which he is consciously devoted, and that the individual who honestly tries to be objective and unbiased will be constantly on his guard not to allow his ethical predispositions to warp his observation or his logical analysis.

The scientist desires to see things as they are, not in the theatrical high lights and shadows of sentiment. No matter what his social ideals—and it would be foolish to suppose that he has none—his faith, well-grounded in experience, that the universe is a dependable mechanism, in which there is neither whim nor chance, makes him understand that present facts, which are part of the causal nexus of future events and conditions, are not altered by ignoring or trying to distort them.

4. PSYCHOLOGICAL DATA IN SCIENTIFIC ECONOMICS

Desire to secure an objective view of the existing economic order leads some price economists to the ideal of rejecting all data which cannot be reduced to terms of matter and motion, if not to measurable units. Psychological data are eschewed as "subjective," indeterminable, and unamenable to direct observation. The function of the economist, according to this view, is to describe the external, super-

[1] Cf. Wolfe, "The Rôle of Sympathy and Ethical Motivation in Scientific Social Research," *Journal of Philosophy*, April 26, 1923, 231.

ficial organization and operation of the price system. Study of its motivation is ruled out.

While I respect the considerations which have led to this extreme view, I cannot regard it as scientific. No one regards economic organization as a purposeless mechanism. Describe it without reference to its functions and you have something as barren as Spencer's sociology. One cannot any more describe and understand the functional processes of an economic society without considering the motives which actuate them than one could explain the operation of a steam engine without mentioning the steam.

The notion that economics, to be scientific, must discard any attempt to study psychological motivation is born of fatigue over the endless disquisitions on value and valuation which the "psychological" economists, especially certain Americans, inflicted upon us as long as we would stand it. The notion has been nurtured, too, on fears arising from the present unsettled and unsatisfactory state of psychology as a science. The terrific reaction against associationism and hedonism has also been a contributing factor. In their uncritical haste to reject every psychological concept or process that cannot be identified with habit or instinct, some of the younger men have lost sight of the fact that "hedonism" is a term "of infinite variety," and that after all there is a certain important amount of economic activity produced by just such conscious calculations as classical hedonism presupposed. By their intemperate attack on hedonism they have created in some quarters a distrust of all psychology, even behaviorism, which they consider a promise of scientific basis for an understanding of economic motivation. And so we are advised to throw the baby out with the bath.

Connected with this idea of rejecting the aid of psychology, is the notion that all science is measurement. The psychologists have as yet devised no method of measuring motives. How often are we reminded that real (psychic) costs and incomes (pleasures, satisfactions) are incommensurable? We are, as a matter of fact, compelled to judge the strength of the motive by the nature and intensity of the behavior stimulated by it. This arouses new fears; also the criticism that we are engaged in circular reasoning. This charge does not especially worry me. I suspect that some excellent and valuable reasoning is open to it. A man may not know that a gun, or a political proposition, is loaded; but the survivors are able to infer that it was. We have no "psychic units," but we know approximately how our friends, and some of our enemies, will act in any ordinary situation, because we know in a general way the determi-

nants of their behavior—their physical health, their temperament, personality, interests, and training, their habits and standards of conduct, the extent of their knowledge and their rational (also their rationalizing) capacity. The fact that we cannot express this knowledge by a logarithmic graph does not seem to me to argue against its objectivity.

This notion that all science is a matter of measurement is an unwarrantable importation from the natural sciences. A true scientific method for economics must take cognizance of the peculiarities of the data with which economics has to deal. It cannot be built up on analogy. I may say that the behavior of shopgirls indicates that they get more satisfaction out of dressing presentably than from three square meals a day. This, if true, is a significant fact, and it is much more important that we find its cause-and-effect relations than that we should lament our inability to state just *how much* the one satisfaction exceeds the other, or just "at what point" the marginal utilities of clothes and food are equal. Even in mathematics we have "greater than" and "less than." To be scientific we need not always reduce our data to quartiles and medians, however desirable it may be to do so where the nature of the data allows it. Economics deals with human beings and the rest of nature in relation to their economic purposes and activities. As man is the end of it all, so does he embody the motive factor. He creates and consumes and destroys wealth, and contributes to individual and social welfare or illfare. Some ignorant and over-individualistic cattlemen in certain out-of-the-way districts of Texas dynamite the concrete dipping vats through which the law prescribes that all cattle shall be driven to rid them of fever ticks. That is a colorless statement of fact. The cost to the county is $1500, say. Another colorless statement. The county wants to avoid further expense of this kind and yet get rid of ticks. An economic-legal desire. How can it accomplish this purpose? You cannot go further, you cannot devise a certain and economical procedure without finding out why the men blew up the vats. You are face to face with motive, whether you bring a suit in the criminal court or whether you desire merely to save the cattle industry and the tax-payers' money. A non-psychological price economics might trace out the effects of dipping and of vat-dynamiting, respectively, upon the price of dressed beef, or, via joint demand and substitution, upon the price of the chemicals that enter into T. N. T. But I confess that I cannot see how this knowledge would be of any practical value unless it could be used in altering the attitude of the frontier-minded, hill-country small ranchman.

This illustration suggests a sub-type of price economics, one which would admit a consideration of motive but which would attempt rigidly to exclude from the economist's consideration every motive which is not clearly and directly "economic," that is to say, pecuniarily hedonistic. This was the position theoretically taken in the methodology of classical economics. Rigidly carried out, it would of course mean that abstraction, the economic man. If we have in mind only the classicists' analysis of the price system, and leave out of present consideration their interest in ethical and practical problems, we shall probably be safe in thinking that it was this artificial restriction of the data regarded as "economic" which more than anything else subjected them to the flank attacks of Ruskin, Carlyle, and Matthew Arnold, the petulant harassings of the sociologists, and the devastating frontal attacks of Veblen. The same classical indifference to anything but pecuniary motivation produced the revolt of Hobson, in England, and of younger men, like Carleton H. Parker, with some insight into the newer psychology, in this country.

I doubt if extended argument is necessary to convince any but those most wedded by long established habit of thought to the classical tradition, that an economics which admits to consideration some type or types of motive, and yet excludes others of great, if not possibly equal, importance in their influence on the intensity and direction of economic activity, cannot be scientific. Thomas objects to the presence of *ethical* norms of any kind in the conduct of research, on the ground that they lead to biased and unscientific selection of facts and deprive us of opportunity to study all the facts in connection with one another, which is the only connection in which their study can be scientifically valid.[1] The same criticism applies to partiality in selection of data, when produced by *a priori* definitional limitation of the kind of data admitted to discussion. If we accept, for the sake of the argument, the pure science contention that research should have no ethical or practical purpose in mind, much less any posited ethical norm, it will remain true that a really scientific description of the price system must be based on factual data inclusive not only of purely hedonistic and pecuniary motives but also of a great variety of impulses, sentiments, and attitudes rarely if ever given due recognition in the economic treatises. Suggestion, imitation, emulation, habit, custom, class standards, class prejudice, moral, political, and aesthetic sentiments, as well as "instincts," organically inherited

[1] W. I. Thomas, and F. Znaniecki, *The Polish Peasant in Europe and America*, 1918, I, 9. Cf. Wolfe, "The Rôle of Sympathy and Ethical Motivation in Scientific Social Research," *Journal of Philosophy*, April 26, 1923, 232.

propensities or behavior patterns—of workmanship, contrivance, self-assertion, self-abasement, etc.—rivalry, desire for recognition, gregariousness, balked dispositions, suppressions, repressions, sublimations, etc., must come in for recognition and evaluation whenever observation shows them to have significant influence on physical production, trend of market prices, distribution of income, and economy (however defined) of consumption.

This means that the scientific economist must be cognizant enough of the general results of psychological research to be able to interpret his data in the light of present psychological knowledge. Especially must he be familiar with social psychology. This need no more be considered converting economics into psychology than Jevons' sunspot theory or Moore's Venus theory of business cycles makes economics a phase of astrophysics or celestial mechanics, or than Ellsworth Huntington's [1] hypothesis, if he can substantiate it, that business depressions are due to poor health and poor health to bad weather, makes economics include all meteorology. Neither Jevons nor Moore, nor again Huntington, waste energy in praising or blaming the cosmic events which they find correlated with economic cycles. Similarly the scientific economist who finds it essential to take account of a wide variety of human interests, sentiments, and attitudes, as part of the causal complex of economic life, will not allow sympathies and antipathies to warp his analysis of the way in which these psychological factors affect economic processes. So long as the purpose is merely scientific description, without reference to evaluation of economic facts and processes in terms of human welfare, all human motives are to be regarded in the same "disinterested" spirit in which the chemist watches the antics of ions and atoms, or the mathematician calculates the perturbations produced in the Moon's motion by Jupiter. Nobody is concerned in "doing something" about these perturbations. While it is different with human motives, in that they do not lie entirely beyond power of control and modification, and that consequently they must come in sooner or later for economico-ethical valuation from some functional standpoint, the first task is to ascertain their nature and their immediate influence.

All science must be thoroughly deterministic, that is, its observations and logical analyses must rest on the faith that nothing happens without a cause and that every cause has its effect. A scientific psychology must be deterministic, must aim to describe or explain psychic phenomena in mechanistic terms, as part of the general

[1] *World Power and Evolution*, 1919, ch. 2.

cause-and-effect sequence or nexus of things. It must regard man as a part of nature, and study the behavior, in terms of cause and effect, of this particular part. Human motives, whether expressed in psychological terms or with some remnants of anthropomorphic concepts, such as mar the literature of psychoanalysis, come in as links in the causal sequence determining human behavior, economic behavior included. A non-psychological economics must therefore be regarded as either a superficial fragment, or as positively non-scientific. It is Hamlet with Hamlet left out. And this conclusion is arrived at, be it noted, not on the ground that economics must be concerned with welfare, but on the assumption—for the time being—that economics is only a disinterested but orderly description of the price system.[1]

An economics which courageously faces the task of observing and analyzing the economic bearing of a much larger array of human motives than was admitted to the professional consciousness of the hedonistic classicists and marginalists will doubtless for a long time to come lack the assurance and the aesthetic symmetry and definiteness of the older systems. But it will avoid certain pitfalls. It will not to be the pleasing indoor sport of mathematicians proceeding on a few simple (and, in their simplicity, erroneous) assumptions as to economic motivation. It will not be the kind of superficial price analysis now so popular with the commercially minded writers of business texts. And above all it will avoid the metaphysical, *a priori,* and fragmentary subjectivism characteristic of the theorists who regard

[1] I find comparatively little on this question from the point of view of pure science. Most of the younger men who have attacked the hedonism of the classicists and marginalists and counselled greater familiarity with behavioristic psychology have done so largely on the ground that it is necessary to understand the motivation of the human animal before we can proceed to build up a functional theory of economic welfare. This I concede, but I also think that a progressive understanding of mechanistic behaviorism is necessary as part of the essential data foundation of even a purely descriptive economics. While in the main they proceed from the welfare point of view, reference may here be made to the following discussions of the subject: Z. C. Dickinson, *Economic Motives, a Study in the Psychological Foundations of Economic Theory,* 1922; R. G. Tugwell, "Human Nature in Economic Theory," *Jour. Pol. Econ.,* xxx, 317–45 June 1922; J. M. Clark, "Economics and Modern Psychology, *Jour. Pol. Econ.,* xxvi, 1–30; 136–66, January and February 1918; Leo Wolman, "The Theory of Production," *Amer. Econ. Rev.,* xi, 37–56, March 1921; W. C. Mitchell, "Human Behavior and Economics; A Survey of Recent Literature," *Quart. Jour. Econ.,* xxix, 1–47, November 1914; Carleton H. Parker, "Motives in Economic Life," *Amer. Econ. Rev., Supp.,* viii, 212–31 March 1918 (reprinted in his *Causal Laborer and Other Essays*).

all economic theory as a mass of delicate logic revolving around a value concept.

Criticisms of the marginalists have been preponderantly attacks on the false psychology they employ.[1] Several well-known younger writers have attacked the older economics on the ground that its hedonistic calculus of utility and market values takes no account of the conscious, not to say malicious, creation of demand. In a society so permeated by advertising and emulative expenditures as ours, and in the presence of men who extoll the virtues of thrift in one breath and praise the art of salesmanship in the next, this is a vulnerable point for attack. But it is not the most important thing to emphasize. If all the critics had to offer were the services of a broader study of motives in an explanation of the socio-psychological causation of demand, classical economics would not stand in need of revolutionary emendation. Classicism and marginalism fail to meet present demands, not only because they afford practically no theory of the origin and stimulation of demand and because they have neglected a scientific study of consumption, but much more broadly speaking because they do not give us a realistic theory, that is, a theory which explains economic life as it actually is and one based on an adequate inductive (statistical and genetic) method. This failure is due in the main to the fact that the classicists and marginalists were the victims, as they for a long time made of us, of unconscious metaphysical biases derived from eighteenth century philosophy, and of a psychology, adequate to explaining a certain limited type of motive, but inadequate to the needs of a generation of theorists who are beginning, with the help of the behavioristic and social psychologists, to see the human organism as a whole and to see that "economic" motives are neither all hedonistically acquisitive nor capable of being dissected out and treated in entire independence of the rest of the psychic processes of the individual and the community. Interest in what Veblen calls taxonomy, and someone else "conceptualism," contributed to the unreality and the negative quality of much of classical doctrine. It was, or came to be, unreal, not only because of its inadequate psychology, but because of its dogged insistence upon free competition as the "natural" and actual condition of economic processes, its disastrous deficiency in historical —or evolutionary—perspective, and its habit of analysis in technological terms which closed its eyes to those many and increasingly important "intangibles" which Veblen has thrown on the screen for

[1] See, for illustration, Boucke, *A Critique of Economics*, 1922, ch. 2.

us, in light perhaps a little too concentrated. It was negative in that it was, again from its social and philosophical origins, forever telling us what we could not do.[1]

The marginalists inherited the psychological and metaphysical preconceptions of the classicists, so much so that many regard them, perhaps unfairly to the classicists, as merely a type of classicism gone to seed. The marginalists, tacitly accepting classical preconceptions, and seizing with avidity upon analytical geometry and calculus as new tools of economic analysis, proceeded to pile up a formidable mass of "value theory" which left objective reality to one side, helped to solve no actual economic problem, and convinced numbers of economists of the danger of attempting to analyze "subjective" factors.

Therein is the origin of the discussions, so prominent in some recent meetings of the American Economic Association and in many recent articles, of the relative merits of "subjective value" economics, as exemplified for instance in Fisher and Fetter, and a purely descriptive and non-psychological price economics. Fortunately, however, the choice does not lie between these extremes. It is not yet proved that a subjective value economics is impossible or without practical utility if we only learn enough behaviorism and social psychology. And if we start with descriptive price economics we are sure to be brought back sooner or later to the problem of causes and motives. Either way an adequate psychological knowledge is a *sine qua non* of a realistic, a true, and a functional economics.

In the foregoing sections we have rejected the pure science ideal on the grounds of its impracticability and non-economy. We have held that ethical or practical interest, motivating purposeful research, is not incompatible with scientific objectivity in the processes of the research itself. And we have indicated why economic analysis which attempts to get along without the aid of psychological knowledge and data must be regarded as superficial and unscientific, in that it leaves out a most important link in the chain of cause and effect, with which all but merely taxonomic science must be concerned. Thus far we have tried scrupulously to avoid the question as to whether the scientific economist may make his analysis from the standpoint of

[1] Mention need be made, by way of illustration, only of the wages fund doctrine and Malthus's population objection to socialism. To my mind, this taxonomic unreality is most evident in the earlier and the later classicists. John Stuart Mill and some later economists, like Taussig, profoundly influenced by Mill (Mill was the standard text in Economics I at Harvard down to 1903), are less interested in metaphysical niceties than in trains of theoretical analysis which give promise of positive functional value.

a fundamental ethical norm, or whether science and ethics are at such opposite "objective" and "subjective" poles that the economist must rigidly avoid all ethical valuations. We have now to attack this most fundamental question and attempt to suggest why analysis and valuation of economic phenomena with reference to a fundamental ethical standard, provided that standard be chosen with adequate scientific perspective, not only is not unscientific but is essential to the development of a functional economics, an economics worth while.

5. ETHICAL NORMS AND FUNCTIONAL ECONOMICS

a. *The Relation between Price Economics and Welfare Economics*

The early classicists thought of political economy as the "science of wealth." Wealth was defined as scarce material goods, that is, as scarce things which have the power of satisfying wants. Production was the creation of these scarce goods, and labor, to be "productive," had to result in a material commodity. Later this curious conception of productiveness was modified and all labor which resulted in a thing or service which had exchange value was recognized as productive. But it made no difference whether the service was beneficial or harmful. Rigidly carried out, this concept requires the economist to be entirely indifferent to the ethical quality of a given demand. Thus Davenport: "Peruna, Hop Bitters, obscene literature, indecent paintings, picture hats and corsets are wealth, irrespective of any ethical or conventional test to which they may or may not conform. Being marketable, price-bearing, they are wealth. So likewise of services; in no sense is economic productivity a matter of piety or of merit or of social deserving. Were it otherwise it would be necessary to change one's political economy according as one were talking to a prohibitionist or a German. What is the economist, that he should go behind the market fact and set up a social philosophy of ultimate appraisals?"[1] Taylor, in an equally uncompromising vein, maintains the old abstraction. "To produce is to create utilities," and "utility includes all sorts of fitness to satisfy wants, without respect to the character of the wants."[2] Similar logic is common enough in the texts.

It is, of course, unnecessary to set forth the grounds upon which this point of view is held to be justified. A significant result of it has been, however, that the conventional value economics has become, as Cooley says, "almost wholly a short-range study of mechanism, remarkable for elaborateness within a confined area, but not at all re-

1 *Economics of Enterprise*, 1913, 126.
2 *Principles of Economics*, 1921, 47, 48.

markable for breadth or for any light it throws on the wider economic and social significance of the mechanism of which it treats."[1] Wolman objects to pecuniary economic theory not only on the ground that money estimates of national wealth involve "logical leaps and methodological assumptions," but on the ground of "more subtle and indirect influences." He thinks that "the limits of economic science, particularly in the treatment of the theory and facts of production, have been harmfully restricted by the influence of the pecuniary point of view." "If some of the energy of modern men is expended in the function of bargaining, or valuation, certainly a far greater amount is consumed in the processes of invention, management, and manual labor. Yet, so profoundly has the study of market phenomena and price determination directed scientific economic thinking, that technological and psychological phenomena, fundamental in more ways than one to a proper understanding of the machinery or production, have been almost wholly neglected."[2] Charges similar to these against price economics are common enough. Both Cooley and Wolman object not only to the functional deficiencies of price analysis by itself, if we are to have regard for that "wider economic and social significance of the mechanism" to which Cooley refers, but also to the scientific implication and assumption that our present economic system is motivated by practically no other consideration than acquisitiveness through purchase and sale.

It is a curious fact that birds of very different feather flock together on essentially just this view. The business economists take it for granted, when not reminded otherwise, that profit-getting is the essential function of the present organization, and they rarely permit themselves to question its relation to social welfare. Classical economists, generally speaking, assumed the hedonistic viewpoint, in which acquisition is everything, theoretically, but not actually, without reference to the ethics of the price system. Some later price economists, as has been suggested, treat the price system as a process motivated almost entirely by acquisitive impulses, but with purpose in mind to show the shortcomings of such a system when judged in relation to social welfare.[3]

[1] "Political Economy and Social Process," *Jour. Pol. Econ.*, xxvi, 367, April 1918.

[2] "The Theory of Production," *Amer. Econ. Rev.*, xi, 41, 42, Mar. 1921, Contrast Parry, "A Revaluation of Traditional Economic Theory," *Amer. Econ. Rev., Supp.*, xi, 123–31, March 1921.

[3] Cf. C. F. Ayres, *The Nature of the Relationship between Ethics and Economics*, 1918 (Philosophic Studies issued under the direction of the Department of Philosophy of the University of Chicago, No. 8), 24ff.

Herein lies a source of misunderstanding as to the relation between price economics and welfare economics. It must at once be admitted, I think, that the type of economics popular in most of our schools of business administration, and becoming more and more prevalent in departments of economics allied to schools of commerce and manned by men trained in and to their point of view, has only a tenuous interest in the larger problems of social welfare. I do not mean to voice a wholesale condemnation of the colleges of commerce, for there are notable exceptions, but I think there is ample indication either of a deficiency in social point of view, that is, one in which the larger general welfare is held in mind, or, what is equally open to adverse criticism, as easy-going assumption that business interests and the public interest are synonymous. I consequently regret the nation-wide stampede toward business economics and the invasion of the undergraduate economics curriculum by courses which are at least of a narrow professional nature, if not open to the charge of centering the students' attention on acquisitive money-making rather than on the functions of the economic system from the point of view of social welfare and the creation and distribution of individual opportunity. Great as the danger from the out-and-out business economists is, we must leave it to one side, as a matter which merits more than parenthetical consideration. The central point of misunderstanding, productive of not a little futile discussion, lies in the common belief that price economics and welfare economics are necessarily incompatible.

The welfare economist, the theorist who believes that economics and ethics cannot be separated into two independent fields, need have no quarrel with the price economist *so long as* the price economist does not take either the pure business or the pure science attitude, but clearly recognizes that his analysis of the processes of the price system is only the descriptive foundation, as realistic, fair, and well-balanced as he can make it, upon which a positive, constructive, functional, welfare economics can be erected. And this is precisely what some, at least, of the men known as price economists recognize. Mitchell and Davenport, neither of whom resents being called a price economist, and Fetter,[1] who does, take this position. And Veblen, who is not thought of as a price economist, is in a sense really quite as much one as any of the three mentioned, because it is characteristic of all his writings, critical and otherwise, to insist upon a realistic description of the price system.

1 "Price Economics versus Welfare Economics, Contemporary Opinion," *Amer. Econ. Rev.*, x, December 1920.

In 1916 Mitchell published an article on "The Rôle of Money in Economic Theory,"[1] which he prefaced with the statement that no recent tendency in economic theory seemed to him more promising than the tendency to make the use of money the central feature of economic analysis.[2] The article is really a plea for a realistic analysis of the processes of the price system as a preliminary to a constructive welfare economics. But Mitchell found it necessary to pay his respects, somewhat adversely, to the "psychic income" economics of Fetter[3] and the "counting-house" economics of Fisher, both representatives of what he calls the American psychological school. Fetter replied, with some asperity, four years later.[4] It is unnecessary to go into the question of the relative merits of Fetter's hedonistic, subjective analyses and Mitchell's preference for statistical analysis of directly observable, external, objective facts. (It is notable that Fetter has somewhat modified his views, away from the old hedonism and in the direction of the modern volitional psychology, and that Mitchell had as early as 1914 looked to behavioristic psychology as a promising basis for economics as a science of behavior.[5]) The interesting thing is that however they may differ as to method and subject matter of analysis both writers regard price economics as a stepping stone to reconstructive economy. Fetter indeed declares that "the super-simplified thinking of the price economics does not lead to valid welfare conclusions," in which belief he is apparently joined by Wolman and others, yet he admits that "the real economist needs surely to study and to know business conditions, needs for many purposes to be able to report and interpret the views as well as the facts of the business world."[6] Mitchell points out that "in the interests of social welfare itself we need clearer insight into the industrial processes of making goods, the business process of making money, and the way in which both sets of activities are related to each other and to the individual's inner life."[7] Now it may be

[1] *Amer. Econ. Rev., Supp.*, vi, March 1916.

[2] *Ibid.*, 140.

[3] It is fair to state that his criticisms were directed at Fetter's earlier work, the *Principles of Economics*, 1904.

[4] "Price Economics versus Welfare Economics, Contemporary Opinion," *Amer. Econ. Rev.*, x, December 1920.

[5] "Human Behavior and Economics: A Survey of Recent Literature," *Quart. Jour. Econ.*, xxix, November 1914. Also see "The Prospects of Economics," elsewhere in this volume.

[6] Fetter, *op. cit.*, 735.

[7] Mitchell, "The Rôle of Money in Economic Theory," *Amer. Econ. Rev., Supp.*, vi, 160 March 1916.

that Mitchell's faith in the objective analysis of price and business enterprise will turn out to be as unsatisfying, in practical constructive results, as Fetter's earlier subjective analysis of value and psychic income. Personally I do not think so, but that is not the question. The fact is, Mitchell is quite as much interested in social welfare as is Fetter. If Mitchell believes that economic theory should "cluster around money," it is not because he expects to find in market prices a measure of subjective utilities or of social welfare, but because he sees in these pecuniary processes of business enterprises a key to an ethical evaluation of the present system, especially with reference to the social functions of "industrial and pecuniary employments."[1]

It thus appears that some of the men who call themselves price economists are price economists first only because they are in their deeper thought and impulses welfare economists. Similarly, the welfare economist who accomplishes practical results will know thoroughly the objective facts of the price system. He will also know the human nature expressed in and molded by this system, for the sentiments and attitudes produced by a given social situation are a part of that situation, and any change in it must await some modification in the attitudes proper to it. Whether price economics is a field large enough, and has a method inclusive enough, to furnish us with this necessary knowledge is mainly a matter of the definition of price economics. Even a cursory perusal of the literature shows that price economics means different things to different people. The economist who is not content with the dilettantism of "pure science"—and who is?—and who desires to contribute his energies to the development of a dynamic, realistic, and functional economics will take his data without much reference to definitional limits of the respective social sciences.

b. *The Nature of Functional Economics*

Now what is a "functional economics"? I mean by the term a body of theory, based upon an unbiased inductive and deductive analysis of an adequate range of factual data, designed to give us a systematic knowledge of the conditions determining economy and efficiency in the production, distribution, and consumption of material goods and services. Put in another way, functional economics is a

[1] Cf. Veblen, "Industrial and Pecuniary Employments," in *The Place of Science in Modern Civilization and Other Essays*, 1919; reprinted from *Publications of the American Economic Association*, 3d Series, Vol. II, 1901.

study of opportunity and its use, insofar as opportunity depends upon scarce goods and services.

It should be noted that the terms economy and efficiency both presuppose a process and an end or purpose to which the process is directed. There must be something to be economical and efficient *for*, and activity the suitability and adaptability of which, in relation to the end in view, is measurable by the degree to which the end is accomplished. Theoretically the economist—of the pure science variety, for instance,—could take any end or purpose, one which has been exemplified in history or a purely hypothetical one, and investigate the efficiency of any given organization and process, again our actual economic system as it is to-day, any past system, or an ideal system, in relation to the posited end. Thus the end might be taken as the creation and utilization of opportunity, as pure acquisition, regardless of productive services, as national survival, regardless of the utility of surviving, as aggrandizement of the rulers, as the largest attainable population, and so on. Theoretically any number of systems of functional economics is possible, but a functional economics at once scientifically in accord with the facts of human psychology and capable of enlisting the interest of people who desire life to be worth living, will have to make no bones in taking welfare or happiness as its end.

While I would not undertake to prove that the classical economists were formally and consciously welfare economists in the sense in which we now use the term, that is, in a somewhat illogical contradistinction to price economics, I think a fair survey of their writings and their spirit would show that they did very distinctly aim at a functional economics. That the philosophies and the social conditions and issues of their time were such as to cause them to emphasize negative, limiting considerations, supposedly inherent in "natural law," rather than positive social construction, is no argument against this conclusion. It was suggested above that the classicists were always interested in practical problems and that their theoretical writings got their impulse from live issues of the time rather than from any interest in pure science. It is difficult to be interested in public issues without holding, consciously or otherwise, to ethical norms and making ethical valuations.

It has been shown again and again that classical economics, whatever its methodological theory, did not succeed in divorcing itself from ethics.[1] No more convincing evidence of the probability that

[1] See especially C. E. Ayres, *The Nature of the Relationship between Ethics and Economics*, 1918, ch. 2; Veblen, "Why Is Economics not an Evolutionary

the economist who prides himself on being without ethical postulates and valuations is deceiving himself could be adduced than that which can be had from a comparison of the methodological pretentions of the classicists with the content and tone of their major writings.

The grounds for holding that the classicists did not succeed in keeping their ethics and their economic theory divorced have in part already been suggested, but may be summarized more inclusively at this point. (1) They were philosophically trained and many of them had deep, not to say professional, philosophical interests. (2) The central and authoritative group of classicists, that centering in the Political Economy Club, were exponents of a definite and closely knit school of ethics, Benthamite utilitarianism.[1] (3) Their work grew out of and had reference to the practical issues of their time. (4) Their ideal of free competition was but a specific expression of the eighteenth century political revolt. (5) Their period began and coincided with the modern movement for liberalism and democracy.[2] (6) It coincided also with the tremendous development of material productive power and technique, ushered in by the great inventions, a development which they did not wish hampered, and the ethical value of which they perhaps overestimated, because, with Bentham, they regarded material wealth as the basis and means, in almost mathematical ratio, to individual and national welfare. (7) They either took a conservative middle-class point of view, actuated by considerations of security for vested interests, or betrayed a deep sympathy for the working classes and sought to find ways by which the condition of the workers could be improved. Both of these tendencies may be found in the same man, Malthus for example, a fact which goes to show that the attempt was unconsciously being made to harmonize two ethical desiderata—security and equity. (8) They were prevailingly nationalistic, concerned with the "wealth of nations." Frequently, however, they not only confused commercial

Science?" "The Preconceptions of Economic Science," and "Professor Clark's Economics," in *The Place of Science in Modern Civilization*, 1919; Bonar, *Philosophy and Political Economy*, 1893, Book III. Boucke, *The Development of Economics*, 1921, 155ff., names a number of early economists who "betray a strong undercurrent of moralism," but exonerates most of the classicists. He falls into this error by taking their word as to their intentions, without critical analysis to see how well these intentions were carried out in their works. Certainly it is an interesting piece of classification to call Malthus, for instance, a non-ethical, or even a non-moralizing, economist. Cf. Bonar, *op. cit.*, 212, 213.

1 Leslie Stephen, *The English Utilitarians*, Vol. II, 28ff., 52ff.

2 No one, perhaps, brings out this fact so significantly as Stephen, in his *English Utilitarians*.

prosperity with popular welfare but thought of the "nation" as synonymous with the propertied ruling classes.[1] (9) Hence, in spite of sympathy for the workers, and in spite of their Benthamite background of "the greatest good to the greatest number," they regarded the workers primarily as means, not as ends—an error in logic, if not in ethics, which "advanced" liberals and radicals have been trying to correct for now many decades.

It may be argued, of course, that even if this estimate of the classicists be admitted to be substantially true, it does not prove that some other school or method of approach may not succeed in eliminating, not the ethical interest, but the assumption of ethical norms as part of our premises in economic analysis. If, however, we remember how the hedonistic premise underlies all of the theory of the marginalists, and to what an extent the business economists betray a sort of irritable contempuousness for any economics which does not accept profits and physical output as criteria of economy and "prosperity," and, in addition, to what logical gymnastics the pure science economists are put in their attempt to evade ethical norms and valuations, the implication against the possibility of a non-ethical economics becomes very strong. I have tried to show the reasons for my belief that a non-psychological scientific economics is impossible. My reasons for believing that a non-ethical (not an unethical) economics is likewise practically impossible lie first in the history of economic doctrine, secondly in the very meaning of economy and efficiency, and thirdly in what I conceive to be the fundamental nature of human motivation.

Wealth and material income are significant only as they represent opportunity—opportunity for their possessors to accomplish the purpose, that is, lead the kind of life, they deem worth while. A functional welfare economics, being necessarily a calculus of the fitness of certain means for certain ends, must therefore be a science of opportunity, as noted above. It should be concerned as much with the economical use of opportunity as with its production. Economy of use will of course be found to be dependent upon the distribution of opportunity. If the term economy is to be taken in any but a mechanical, technological sense, the efficiency of our economic organization is to be measured not alone by the technical efficiency of its productive processes, but by the extent to which it succeeds in dis-

[1] On the former point see Matthew Arnold, *Culture and Anarchy*, 230ff. (first edition, 1869). Arnold's reference is to John Bright and the free trade movement, but his strictures will apply equally well to certain attitudes characteristic of classical theory.

tributing products and services where they will do the most good. Distributive "justice" will be found to be a function of economical use of income or opportunity, and the efficiency—even the reality—of production will be dependent upon the attained economy of distribution and consumption. A functional economics will make a very real distinction between acquisition and production, and again between mere technical or value production and social productivity.

Economics as the science of the production, distribution, and use of opportunity, or of wealth and services, is necessarily a science of means and ends. But ethics is also fundamentally a science—perhaps we should say *the* science—of means and ends; of their relative value and significance and their mutual functional relations. If there is disagreement between economic and ethical valuations, one or the other is at fault.

The economists' avowed reluctance to consider ethical or "social" values is an error of judgment, for human attitudes and human activity, the narrowly "economic" included, involve the adaptation of means to aims, ends, or purposes.

Ends or purposes may conflict, either in that they are mutually incompatible, or in their competitive claims on resources, always limited, which it is necessary to utilize for their realization. Consequently the economist, if he is to grapple with the real problem of social economy and not merely skirt circumspectly around its edges, cannot escape the task of taking into consideration the relative value of the conflicting ends themselves. If both labor and capital make claims to the whole product, for instance, the economist may of course point out the impossibility of either realizing its demand; but on the other hand he cannot dodge the duty of judging as best he may, in the light of the available evidence, to what extent the existing distribution contributes to social welfare or interferes with it.

This is of course an essentially ethical, as well as economic, question. To judge the value of a social process or situation in reference to welfare necessarily implies some standard of welfare. Even if the judgment is to be in no more exact terms of measurement than "good," "better," and "best," some final criterion of value is implicit in the judgment.

Right here is where the usual objection to an ethical economics is expressed. It is pointed out that there are many ethical systems, mutually more or less incompatible; that ethical valuations are subjective, and hence that ethics is really a matter of taste, and that "there is no use in disputing about tastes." If this be true, it follows that ethics has no scientific, objective calculus or criterion of

values to offer; and further that the economist who ventures out of the safe confines of measurable mechanical processes and attempts his own calculus of ethical values is no more likely than the professional ethicists to escape the personal equations of taste, association, and habituation, and hence no more likely to be scientific than the metaphysical moralists.[1]

c. *Is a Scientific Ethics Possible?*

We must admit that ethical systems, having been based upon various transcendental and metaphysical postulates, conflict. But it must be remembered that the ethical systems of the past were developed in the absence of a scientific psychology. If behavioristic psychology, with whatever help it may get from psychoanalysis and social psychology, shall prove capable of giving us a really scientific analysis and understanding of human nature, as I believe it will, it should point the way to a fundamental, objectively scientific, ethical norm, or ultimate end of life. The problem of the ultimate end or purpose of human life—or living—is essentially, in fact, a psychological matter.

This is another reason why the economist should be passably familiar with scientific psychology. He need not turn his treatise into a disquisition on the foundations of ethics, but if he is a functional economist, engaged in an attempt to study economic organization and processes in relation to "welfare," he certainly must have, implicitly or explicitly, some definite ideal of what life is for, as a criterion of welfare. And I should much prefer the ideal to be explicit, and that it be scientifically derived, if possible. If there is no way of deriving the Ought from the Is, to use Boucke's terms, it is possible that all the so-called social "scientists" might as well shut up shop. Unless we can derive a criterion of welfare, a final ethical standard, from the facts of human nature as revealed by a scientific psychology, all our theories of economy and efficiency are ropes of

[1] J. M. Clark thinks that "science can never dictate to humanity the choice of the ultimate aims of life, either individual or social, but it may determine objectively the value of means to ends where ends are known." ("Economic Theory in an Era of Social Readjustment," *Amer. Econ. Rev., Supp.*, ix, 288, March 1919.) Boucke holds that "there is no possible way of deriving an Ought from an Is," and hence that economists "will make facts a subject for ethical discussions, but not a source of ethical criteria." Later he states that "economics should be regarded . . . as the systematic study of all the facts bearing upon relations of *weal* and wealth." (*A Critique of Economics*, 1922, 258, 259, 283,—Italics mine.)

sand, and neither economics nor the other social sciences can function in developing a more rational social organization.

This chapter is already too long, and I cannot, therefore, offer more than the merest suggestion of the grounds on which I think a scientific ethical norm not only possible but inevitable, and what I think it will be.[1]

In the first place a scientific psychology is possible, because man is a part of nature and in no way an exception to its laws. At least I see no reason to suppose that he is. His behavior is as mechanical, in the last analysis, as that of any other part of nature. Being mechanical it is amenable to investigation, to discovery of the main currents of its causation. Reduced to its lowest terms the behavior of a human being is the response of his organism to environmental stimuli. The term environment is taken in a broad sense, and the nature of the responding organism is recognized as the product of organic inheritance and all the individual's own past responses, that is, his experience. Given the nature of the stimulus, these two determine the response. The external stimulus, where it is external, produces a change in the state of the organism, which change is either pleasant or unpleasant. This change becomes what we may broadly call the motive to behavior.[2] Of course it need not be conscious. Every human act is the result of a combination of motives, or organic states, which in part reinforce and in part conflict with one another. The nature and direction of the act is determined by the nature, direction, and strength of the component motives. Choice is the result of a conflict of motives, in which the stronger combination prevails. (It makes no difference to the argument whether we think of a "composition and resultant" of motives or of a complete alternation between opposed impulses.)

When the resultant act is the product of unconscious, reflexive, "autonomic," "instinctive," and purely habitual motivation, the act is the expression of the organism as governed by the lower centers.

1 For suggestive treatment of this subject, not however entirely satisfactory from the standpoint of scientific behavioristic psychology, reference may be made to Warner Fite, *Individualism: Four Lectures on the Significance of Consciousness for Social Relations*, 1911, and R. B. Perry, *The Moral Economy*. I may refer also to my article on "Individualism and Democracy," *International Journal of Ethics*, July 1923. This article, however, deals less with the psychological basis of an individualistic utilitarian theory of ends than with the bearing such a theory inevitably has upon our conception of democracy and upon the problem of economy and efficiency in the distribution of opportunity.

2 On the psychologists' use of the term "motive" see F. A. C. Perrin, "The Psychology of Motivation," *Psychological Review*, May 1923.

When the act is the result of conscious "choice" it is the result of the strongest desire, and that is invariably the one satisfaction of which the individual believes will contribute most to his happiness or to the greatest extent avoid unhappiness. Both automatic and "willed" action is thus directed toward "satisfiers" and away from "annoyers."[1]

Now from any common sense point of view it simply is not true that men do not seek happiness, or at least what their illusions lead them to regard as happiness. Even Boucke, with his metaphysical background, admits that ethical systems, whatever their mutual conflicts, all assume that life is worth while.[2] Well, it is worth while just to the extent, as is claimed of a certain brand of cigarettes, that it "satisfies." Knight intimates, upon the authority of "the authors of great imaginative literature," that we should never fall into "any such palpable illusion as the belief that men either strive for happiness or expect to be made happy by their striving."[3] It would be futile to take issue with him, because controversy would hinge on misunderstanding as to the meaning of the term happiness. It is entirely possible that the great authors of imaginative literature were themselves under some illusion as to the nature of happiness. And it is to be remembered that the sponsors of non-utilitarian ethical systems lived mainly in pre-scientific times and were themselves the product of theological, not to say ecclesiastical, and political influences the trend of which was toward some ethical norm which would serve the needs of—"satisfy"—some special class or interest. "Duty" has covered a multitude of sins. Look into the fence corners of all the duty norms and you will find that the ultimate sanction is in furtherance of *someone's* interests. It must be admitted, of course, that the term happiness has acquired such a coating of "grossly hedonistic" or "materialistic" connotation, and is so indefinite in its popular meaning, that it would be desirable to substitute another term if we would find one. Yet I am content to keep it, because I believe it possible to give it some approximation to the

[1] Knight ("Ethics and the Economic Interpretation," *Quart. Jour. Econ.*, xxxvi May 1922) objects, with characteristic strain of mysticism, to this "harmonious adjustment" theory on the ground that we are always wilfully getting into trouble, that is, that "the things we work for are 'annoyers' as often as 'satisfiers'" (469, 470). His error lies in not taking a sufficiently mechanistic view of behavior. Anything which we seek is not an annoyer, or if it is, it is less so than its alternative. To be seasick may be annoying but it is less so than not to go to Europe.

[2] *A Critique of Economics*, 1922, 258.

[3] *Op. cit.*, 469.

essential scientific definiteness. I define happiness as "that psychophysical state or tone which results from, and accompanies, the full, free, and healthy functioning of the individual's powers and capacities, to an extent and in directions which do not interfere with a like functioning of the powers of other individuals."[1] It makes little difference, therefore, whether we take happiness or self-expression as the final end of living. Both, if rationally analyzed in the light of modern behaviorism, find the end in the individual and the means in social processes.

d. *The Relation of a Scientific Ethics to Functional Economics*

If a theory of fundamental ethical norms, worked out on a scientific psychological basis, along these suggested lines, is correct, its bearing on functional economics is clear. It is the business of practical constructive economic endeavor, and indeed of social endeavor of all kinds, to further a constantly nearer approach to the sort of organization and processes which will give opportunity for every individual to live as full and free a life as is consistent with like opportunity for others. Since the individual is helpless, by himself, the creation of opportunity is essentially a coöperative social process and function. It is accordingly the task of a functional economy to secure a social organization in which every ounce of productive capacity (broadly defined) is discovered, trained, and utilized in the coöperative process of producing opportunity. This means "the conservation and utilization of human resources."

It is also the task of functional economy to secure the most economical distribution of opportunity. Opportunity should be put where it will do the most good. That is a standard in consonance both with Christian ethics and with a scientific, psychologically grounded economics. It can be shown that this leads to democracy, defined as equity of opportunity, as the ideal of distributive justice, and, if realized, to a society in which waste from unproductive idleness and undeveloped talent, and from emulative consumption, conspicuous expenditure, acquisitive predation, and the like would be reduced to a minimum.[2]

The fundamentals of a functional welfare economics will include

[1] "Individualism and Democracy," *International Journal of Ethics, July* 1923.

[2] On this conception of the economic meaning and bearing of democracy, see "Individualism and Democracy," *International Journal of Ethics,* July 1923, and "Some Psychological Aspects of Industrial Reconstruction," *Publications of the American Sociological Society,* xiv, 1919.

the following: (1) A comprehensive monographic survey of the technological, financial, and exchange processes of the price system. (2) An adequate survey, based on the best and latest attainable psychological knowledge, of the motives and attitudes characteristic of individuals and groups under the price system. (3) A generally accepted, psychologically grounded, norm of welfare. (4) Evaluation of the various aspects of the present price system with reference to this final norm, or more directly, to the objective conditions which may be taken as indicative of the extent to which our economic organization is serving as a means to the final end of human living.

APPENDIX I

GUIDE TO THE HISTORY AND PREVIOUS WORK OF CONTRIBUTORS

RAYMOND T. BYE was born at Germantown, Philadelphia, Pa., 30 January, 1892. He had his preparatory training at George School, Pa., and attended Swarthmore College, 1910–14, Harvard University, 1914–15, and the University of Pennsylvania 1915–18.

Degrees: A.B. Swarthmore, 1914.
A.M. Harvard, 1915.
PH.D. Pennsylvania, 1918.

Present title: Assistant Professor of Economics, University of Pennsylvania.

Positions held: Instructor in Economics, University of Pennsylvania, 1916–20; Assistant Professor of Economics, University of Pennsylvania 1920 to date.

Courses now taught: Problems of National Wealth and Income; Principles of Economics; Economic Theory; Recent Developments of Economic Theory; History of Economic Thought.

Publications:

1. *Books: Capital Punishment in the United States.* The Committee on Philanthropic Labor of the Yearly Meeting of Friends (Philadelphia), 1918.
2. *Articles:* "Social Welfare in Rate Making," *Pol. Sci. Quart.,* xxxii, 522–41, December 1917.

JOHN MAURICE CLARK was born at Northampton, Mass., in 1884. His under-graduate work was done at Amherst College and his graduate work at Columbia University.

Degrees: A.B. Amherst, 1905.
A.M. Columbia, 1906.
PH.D. Columbia, 1910.

Present title: Professor of Political Economy, University of Chicago.

Positions held: Instructor in Economics and Sociology, Colorado College, 1910–11; Associate Professor of Economics, Amherst College, 1911–15; Lecturer in Economics, Mt. Holyoke College, 1911–12; Associate Professor of Political Economy, University of Chicago,

1915–22; Professor of Political Economy, University of Chicago, 1922 to date.

Courses now taught: History of Economic Thought; Value Theory; Present Tendencies in Economic Theory; Social Control of Business; Railroads; Economics of Overhead Costs.

Publications:

1. *Books: Standards of Reasonableness in Local Freight Discriminations,* Columbia University Press, 1910.

   Joint author with J. B. Clark of the Second Edition of J. B. Clark's *Control of Trusts,* Macmillan, 1912.

   Joint author and editor with W. H. Hamilton and H. G. Moulton of *Readings in the Economics of War,* University of Chicago Press, 1918.

   The Economics of Overhead Costs, University of Chicago Press, 1923.

2. *Articles:* "Rates for Public Utilities," *Amer. Econ. Rev.* i, 473–87. Sept., 1911.

   "A Contribution to the Theory of Competitive Price," *Quart. Jour. Econ.,* xxviii, 747–71. Aug., 1914.

   "Frontiers of Regulation and What Lies Beyond," *Amer. Econ. Rev., Supp.* iii, 114–125, Mar., 1913.

   "Complications of the Compensated Dollar," *Amer. Econ. Rev.,* iii, 576–605, Sept., 1913.

   "The Concept of Value," *Quart. Jour. Econ.,* xxix, 663–73, 709–23, Aug., 1915.

   "Davenport's Economics," *Pol. Sci. Quart.* xxix, 315–23, June, 1914.

   "Some Neglected Phases of Railroad Regulation," *Amer. Econ. Rev.,* iv, 565–74, Sept., 1914.

   "Economic Aspects of the New Long and Short Haul Clause," *Quart. Jour. Econ.* xxviii, 322–37, Feb., 1914.

   "The Panama Canal and the Railroads," *Commercial and Financial Chronicle,* 47–50, Nov. 28, 1914.

   "The Changing Basis of Economic Responsibility," *Jour. Pol. Econ.* xxiv, 209–29, Mar., 1916.

   "Economics and Modern Psychology," *Jour. Pol. Econ.* xxvi, 1–30; 136–66, Jan. and Feb., 1918.

   "Business Acceleration and the Law of Demand," *Jour. Pol. Econ.* xxv, 217–35, Mar., 1917.

   "The Basis of War-time Collectivism," *Amer. Econ. Rev.* vii, 772–90, Dec., 1917.

   "Economic Theory in an Era of Social Readjustment," *Amer. Econ. Rev., Supp.* ix, 280–90, Mar., 1919.

"The Plumb Plan," *Amer. Econ. Rev., Supp.,* x, 202–206, Mar. 1920.

"Railroad Valuation as a Working Tool," *Jour. Pol. Econ.,* xxviii, 265–306, Apr., 1920.

"Soundings in Non-Euclidean Economics," *Amer. Econ. Rev., Supp.* ii, 132–47, Mar., 1921.

"The Empire of Machines," *Yale Rev.,* (n. s.), xii, 132–143, Oct., 1922.

"Are We Outgrowing Private Capital?" *World Tomorrow,* v, 362–3. Dec., 1922.

"Some Social Aspects of Overhead Costs," *Amer. Econ. Rev. Supp.,* xiii, 50–59, Mar., 1923.

"Overhead Costs I: The Scope of the Problem," *Jour. Pol. Econ.,* xxxi, 47–64, Feb., 1923.

"Overhead Costs II: The Laws of Return and Economy," *Jour. Pol. Econ.,* xxxi, 209–242. Apr., 1923.

"Overhead Costs III: How and Why Large Plants Bring Economy," *Jour. Pol. Econ.,* xxxi, 606–36. Oct., 1923.

. . . . . .

Also a Report to the Special Board of U. S. Engineers on "Canal Connecting Lake Erie with the Ohio River": report not printed in full, but short extracts embodied in the report of the Special Board: 67th Congress, 2nd. sess. House doc. No. 188. Washington, Gov't printing office, 1921.

MORRIS ALBERT COPELAND was born at Rochester, N. Y. in 1895 and prepared for College at East High School of that city. His undergraduate work was done at Amherst college and his graduate work at the University of Chicago.

Degrees: A.B. Amherst, 1917.
PH.D. Chicago, 1921.

Present title: Instructor in Economics, Cornell University.

Courses now taught: Elementary Economics; Trusts and Modern Capitalism; Economic Institutions.

Publications:

1. *Books: Some Phases of Institutional Value Theory,* University of Chicago Press, 1921.
2. *Articles:* "Seasonal Problems in Financial Administration," *Jour. Pol. Econ.,* xxix, 793–826. December, 1920.

PAUL H. DOUGLAS was born at Salem, Mass., in 1892. His undergraduate work was done at Bowdoin College and his graduate work at Columbia University, and at Harvard University.

Degrees: A.B. Bowdoin, 1913.
A.M. Columbia, 1915.
PH.D. Columbia, 1920.

Present title: Associate Professor of Industrial Relations, University of Chicago.

Positions held: Instructor in Economics, University of Illinois, 1916-17; Instructor and Assistant Professor of Economics, Reed College, 1917-18; member of the Industrial Relations Division, Emergency Fleet Corporation, 1918–19; Associate Professor of Economics, University of Washington, 1919–20; Assistant Professor of Political Economy, University of Chicago, 1920–23; Associate Professor of Industrial Relations, University of Chicago, 1923 to date.

Courses now taught: The Worker in Modern Economic Society; The Business Manager's Administration of Labor; Readings in Economic and Political Classics; Types of Economic Organization.

Publications:

1. *Books: American Apprenticeship and Industrial Education.*

   Joint author (with Dorothy W. Douglas) of *What Can a Man Afford? Amer. Econ. Rev. Supp.,* xi, No. 4, Dec., 1921.

   Joint author (with C. N. Hitchcock and W. E. Atkins) of *The Worker in Modern Economic Society,* University of Chicago Press, 1923.

   Joint author (with C. E. Merriam and others) of *History of Political Theory since 1880.* Macmillan.

2. *Articles.*

   "Compulsion vs. Ideals" *New Republic,* vii, 229, July, 1916.

   "The War Risk Insurance Act," *Jour. Pol. Econ.,* xxvi, 461–83, May, 1918.

   "The Socialist Vote in the Municipal Elections of 1917," *Nat. Municipal Rev.,* Mar., 1918.

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ROBERT LEE HALE was born at Albany, N. Y., March 9, 1884. His undergraduate work was done at Harvard University and his graduate work at Harvard Law School and Columbia University.

Degrees: A.B. Harvard, 1906.
A.M. Harvard, 1907.
LL.B. Harvard, 1909.
PH.D. Columbia, 1918.

Present title: Lecturer in Legal Economics, Columbia University.

Positions held: Assistant in Economics, Harvard University, 1907–9; Lecturer and Instructor in Economics, Columbia University, 1915–22; Lecturer in Legal Economics, Columbia University, 1922 to date; Admitted to Bar, Illinois, 1910; Legal Department, American Telephone and Telegraph Co., N. Y., 1910–11 and 1912.

Courses now taught: Legal Economics.

Publications:

1. *Books: Valuation and Rate Making: The Conflicting Theories of the Wisconsin Railroad Commission,* Longmans, Green, 1918.

2. *Articles:* "The Supreme Court's Ambiguous Use of 'Value' in Rate Cases," *Columbia Law Review,* xviii, 208–29, March, 1918.

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"Coercion and Distribution in a Supposedly Non-Coercive State," *Pol. Sci. Quart.* xxxviii, 470–94, Sept., 1923.

FRANK HYNEMAN KNIGHT was born in McClean County, Illinois, November 7, 1885. His undergraduate work was done at the University of Tennessee and his graduate work at Cornell University.

Degrees: B.S. University of Tennessee, 1913.
A.M. University of Tennessee, 1913.
PH.D. Cornell University, 1916.

Present title: Professor of Economics, University of Iowa.

Positions held: Instructor in Economics, Cornell University, 1916–17; Associate Professor of Economics, University of Iowa, 1919–22; Professor of Economics, University of Iowa, 1922 to date.

Courses now taught: Economic Theory; Economics and Welfare; History of Economic Thought; Current Problems in Economic Theory; Principles of Economics.

Publications:

1. *Books: Risk, Uncertainty and Profit,* Hart, Schaffner and Marx Prize Essay, Houghton, Mifflin, 1921.

2. *Articles:* "Thirteenth Census Report on Occupations," *Amer. Econ. Rev.,* v, 184–8, Mar., 1915.

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FREDERICK C. MILLS was born at Santa Rosa, California, in 1892. His undergraduate work was done at the University of California and his graduate work at Columbia University and the London School of Economics.

Degrees: B.L. University of California, 1914.
A.M. University of California, 1916.
PH.D. Columbia University, 1917.

Present title: Associate Professor of Business Statistics, Columbia University.

Positions held: Special Agent, U. S. Commission on Industrial Relations, 1914; Assistant in Economics, University of California, 1915; Instructor in Economics, Columbia University, 1919; Assistant Professor of Business Organization, Columbia University, 1920–23; Associate Professor of Business Statistics, Columbia University, 1923 to date.

Publications:

Books: Contemporary Theories of Unemployment, Columbia University Studies in Political Science, 1917.

A Statistical Analysis of the Tax Burden on Corporations in the State of New York; Part Two of the Report of the Special Joint Legislative Committee on Taxation and Retrenchment of the State of New York. Albany, J. B. Lyon, 1922.

WESLEY CLAIR MITCHELL was born at Rushville, Ill., in 1874. His undergraduate work was done at the University of Chicago and his graduate work at Chicago and the Universities of Halle and Vienna.

Degrees: A.B. University of Chicago, 1896.
PH.D. University of Chicago, 1899.

Present title: Professor of Economics, Columbia University.

Positions held: Instructor in Economics, University of Chicago, 1900–02; Assistant Professor of Commerce, University of California, 1902–08; Lecturer in Economics, Harvard University, 1907–08; Professor of Political Economy, University of California, 1908–12; Lecturer in Economics, Columbia University, 1913–14; Professor of Economics, Columbia University, 1914–19; Chief, Price Section, Division of Planning and Statistics, War Industries Board, 1918–19; Lecturer, New School for Social Research, 1919–21; Director of Research, National Bureau of Economic Research, 1919 to date; Professor of Economics, Columbia University, 1922 to date.

Courses now taught: Types of Economic Theory; Business Cycles.

Publications:

1. *Books:*

Author of

A History of the Greenbacks, University of Chicago Press, 1903.

Gold, Prices and Wages under the Greenback Standard, University of California Press, 1908.

Business Cycles, University of California Press, 1913.

Joint Author and Editor of

History of Prices During the War (War Industries Board's Price Bulletins Nos. 1–57. Washington, Government Printing Office, 1919.

Income in the United States, Its Amount and Distribution, 1909–19, By the staff of the National Bureau of Economic Research, Vol. I, New York, Harcourt Brace & Co., 1921.

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SUMNER H. SLICHTER was born at Madison, Wisconsin, January 8, 1892. His undergraduate work was done at the University of Wisconsin and his graduate work at Wisconsin and at the University of Chicago.

Degrees: A.B. Wisconsin, 1913.
A.M. Wisconsin, 1914.
PH.D. Chicago, 1918.

Present title: Assistant Professor of Economics, Cornell University.

Positions held: Graduate Scholar University of Wisconsin, 1913–14; Special agent, United States Commission on Industrial Relations, 1914–15; Member of research staff of Alexander Hamilton Institute, New York, 1915–16; Fellow, University of Chicago, 1916–17; Assistant, University of Chicago, 1917–18; Military service, 1918; Discharged, commissioned second lieutenant, and placed on inactive list, Dec. 1918; Special agent U. S. Bureau of Labor Statistics in charge of collection of wage data from the automobile industry, 1919; Instructor in Economics, Princeton University, 1919–20.

Courses now taught: Director of the course in Elementary Economics; Trade Unionism in the United States; The State in Relation to Labor; Industrial Government (Seminar); Research in Industrial Relations (Seminar).

Publications:

1. *Books: The Turnover of Factory Labor,* Appleton, 1919.
2. *Articles:*

"The Cream of Wheat Case," *Pol. Sci. Quart.,* xxxi, 392–412, 1917.

"The Legality of the Combination of Competitors under the Sherman Act," *Jour. Pol. Econ.,* xxv, 761–804, 1917.

"The Management of Labor," *Jour. Pol. Econ.,* xxvii, 813–839, 1919.

"The Scope and Nature of the Labor Turnover Problem," *Quart. Jour. of Econ.,* xxxiv, 329–345, 1920.

"Industrial Morale," *Quart. Jour. Econ.,* xxxv, 36–60, 1921.

GEORGE SOULE was born in Stamford, Conn., in 1887. He graduated from Yale College in 1908 with the B.A. degree.

Present title: Director, The Labor Bureau, Inc.

Positions held: Editorial Staff, Frederick A. Stokes & Co., Publishers, 1908–14; Editorial Staff, *The New Republic,* 1914–18; Coast Artillery, U. S. Army, 1918; Editorial Staff, *The New York Evening Post,* 1919; Field Investigator, Interchurch World Movement, Commission on the Steel Strike, 1919; Editorial Staff, *The Nation,* 1920; Director, The Labor Bureau, Inc., 1920 to date.

Publications:

1. *Books:* Co-author with J. M. Budish, *The New Unionism in the Clothing Industry* of Harcourt, Brace & Co. 1919.

Co-author of *Civilization in the United States,* chapter on "Radicalism," Harcourt, Brace & Co. 1922.

Co-author of *Public Opinion and the Steel Strike,* chapters on "Civil Liberties" and "Welfare Activities of the U. S. Steel Corporation," Harcourt, Brace & Co. 1922.

2. *Articles:* "The Relation Between Wages and National Productivity," *Annals of the American Academy of Political and Social Science,* March, 1922. "The Productivity Factor in Wage Determination," *Amer. Econ. Rev.,* xiii, 129–40, Mar., 1923.

"Labor's Banks," *Atlantic Monthly,* June, 1923.

Numerous occasional articles and reviews in *The New Republic* and *The Nation,* etc.

REXFORD GUY TUGWELL was born at Sinclairville, N. Y., July 10, 1891. He prepared for College at Masten Park High School, Buffalo, N. Y. and did his undergraduate and graduate work at the University of Pennsylvania.

Degrees: B.S. in Econ., University of Pennsylvania, 1915.
A.M. University of Pennsylvania, 1916.
PH.D. University of Pennsylvania, 1922.

Present title: Assistant Professor of Economics, Columbia University.

Positions held: Assistant in Economics, University of Pennsylvania, 1914–15; Instructor in Economics, University of Pennsylvania, 1915–17; Assistant Professor of Marketing, University of Washington, 1917–18; Business Manager, American University Union in Europe, 1918; Assistant Manager, Niagara County Preserving Corp., 1919; Instructor in Economics, Columbia University, 1920–22; Assistant Professor of Economics, Columbia University, 1922 to date.

Courses now taught: Introduction to Contemporary Civilization, Phases of American Economic Life, Proposals for Economic Reorganization, Advanced Economics for Honors Students.

Publications:

1. *Books:*

Author of
The Economic Basis of Public Interest, Banta, 1922.

Editor of
S. N. Patten's *Essays in Economic Theory,* Knopf, 1924.

2. *Articles:*

"The Casual of the Woods," *Survey,* xliv, 472–74, July 3, 1920.

"The Outlaw," *Survey,* xliv, 641–42, August 16, 1920.

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"The Gipsy Strain," *Pacific Review,* ii, 177–96, Sept. 1921.

"Country Life for America," *Pacific Review,* ii, 566–85, March, 1922.

"Guild Socialism and the Industrial Future," *Internat. Jour. Ethics.*, xxxii, 282–88, April, 1922.

"Human Nature in Economic Theory," *Jour. Pol. Econ.*, xxx, 317–45, June, 1922.

"Notes on the Life and Work of Simon Nelson Patten," *Jour. Pol. Econ.*, xxxi, 153–208, April, 1923.

"Some Formative Influences in the Life of Simon Nelson Patten," *Amer. Econ. Rev.*, xiii, 273–85, Supp., March, 1923.

"A Bibliography of the Work of Simon Nelson Patten," *Annals of the Amer. Acad. of Pol. and Soc Sci., Supp.*, cvii, 26–35, May, 1923.

WILLIAM ERNEST WELD was born at Marysville, Ohio, in 1881. His undergraduate work was done at the College of Wooster and his graduate work at Princeton University and Columbia University. He spent twelve years in Syria, India, and other parts of the East.

Degrees: A.B. Wooster, 1903.
A.M. Princeton, 1909.
PH.D. Columbia, 1920.

Present title: Assistant Professor of Economics, Columbia University.

Positions held: Instructor in Economics, Syrian Protestant College, Beirut, Syria, 1903–6; Professor of Economics, Ewing Christian College, Allahabad, India, 1909–18; Instructor in Economics, Columbia University, 1919–20; Associate in Economics, Columbia University, 1920–21; Assistant Professor of Economics, Columbia University, 1921 to date.

Courses now taught: Principles of Economics; Introduction to Contemporary Civilization; Comparative Economic Organizations.

Publications:

1. *Books: India's Demand for Transportation,* Columbia University Press, 1920.

   Joint-author of "A Course in the Principles of Economics," Columbia University Extension Home Study Series, 1921.

   Joint-author of "A Text-book for Standard Courses in Economics," American Institute of Banking, 1922.

2. *Articles:*

Series of Commodity Studies, Standard Statistical Co., 1922.

A. B. WOLFE was born at Arlington, Ill., in 1876. He prepared for College at the Illinois State Normal University; and his undergraduate and graduate work was done at Harvard University.

Degrees: A.B. Harvard, 1902.
PH.D. Harvard, 1905.

Present title: Professor of Economics, Ohio State University.

Positions held: Principal of High School at White Hall, Ill., 1898–99; Instructor in English and History, McKinley High School, St. Louis, 1904–5; Resident South End House (settlement), Boston, 1902–4; Professor of Economics and Sociology, Oberlin College, 1905–14; Professor of Economics and Sociology, University of Texas, 1914–23; Professor of Economics, Ohio State University, 1923 to date. Summer Session teaching: Harvard, 1910–11; Chicago, 1915; University of Colorado, 1919, 1921; California, Southern Branch, 1920; Cornell, 1922; California, 1923. War work: Statistical expert, War Trade License Board, 1917; Head, Investigation Service, Industrial Relations Division, Emergency Fleet Corporation, 1918.

Courses now taught: Modern Economic Theory; Economic Cycles; Social Evolution.

Publications:

1. *Books: The Lodging House Problem in Boston* (Harvard Economic Studies, Vol. II), 1906.

   Readings in Social Problems, Ginn, 1916.

   Work Committees and Joint Industrial Councils, Emergency Fleet Corp., 1919.

   Conservatism, Radicalism and Scientific Method, Macmillan, 1924.

2. *Articles:*

   "The Aim and Content of a College Course in Elementary Economics," *Jour. Pol. Econ.,* xvii, 673–84, Dec., 1909.

   "The Place of the Social Sciences in College Education," *Educational Review,* xxxviii, 58–84, June, 1900.

   "What Makes a College?" *Pop. Sci. Monthly,* Aug., 1911, 151–59.

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   "Social Focus of College Studies," *Religious Education,* xxii, 141–54, April, 1914.

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"The Graduate School, Faculty Responsibility, and the Training of College Teachers," *School and Society,* iv, 423–33, Sept. 16, 1916.

"Economic Conditions and the Birth Rate after the War," *Jour. Pol. Econ.,* xxv, 521–41, June, 1917.

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"Some Psychological Aspects of Industrial Reconstruction," *Publications of the American Sociological Society,* xiv, 64–78, 1919.

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"Industrial Psychology and Americanization," *Pac. Rev.,* June, 1921, 148–56.

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"The Rôle of Sympathy and Ethical Motivation in Scientific Social Research," *Journal of Philosophy,* xx, 225–34, April 26, 1923.

"Individualism and Democracy," *Internat. Jour. Ethics,* xxxiii, 398–415, July, 1923.

APPENDIX II

BIBLIOGRAPHY

Editor's Note: This bibliography is "composite." The authors have each contributed to the making of a single list of books and periodical articles which seem to them important for forming an independent judgment of the trend of economics during the nineteenth and twentieth centuries. It includes references to material specifically defining the scope, the method and the aims of the science and the institutions it studies, and also references to material illustrative of the movements in the various fields into which the science has gradually become sub-divided. It is not intended to be exhaustive, but only suggestive—as a source for further study. The alphabetical indexing method was determined upon after experiment with various kinds of topical classification. All other methods seemed to involve much repetition and cross-referencing and left the material, on the whole, not so clear as it stands at present. The method adopted admittedly has its limitations; but the editor at least, feels that the student, guided by dates of publication and titles, can, with some prudence, find his way to whatever he may need. The effort was to supply a broad base in contemporary material and to work back through the last century with a gradually narrowing range, so that for the years further away only the great landmarks are indicated and for those nearer by, pretty much everything of real importance is referred to. But it must be remembered that each reference involved an act of judgment; and that, therefore, on the whole, the bibliography represents only *what seems important to the authors.*

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"An Interpretation of Social Movements of Our Time." *International Journal of Ethics,* ii, 32–50. October, 1891.

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BRIOT, H.

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